



# AMERICAN GAS

## *Association*

FEBRUARY 1946

VOL. 28 • NO. 2

**One of the many advantages of  
*GAS* and *MODERN GAS EQUIPMENT*—**



The flexibility of modern Gas equipment can, in great part, be credited with the introduction of heat treating to the production line, speeding manufacturing processes, enhancing efficiency, improving products. The catalogue of Gas equipment for industrial heat treating is well nigh limitless—it is added to almost daily as research of the American Gas Association and equipment manufacturers broaches new frontiers in service to industry.

Added to the accurate controllability of Gas and its economy in both unit and overall costs, the flexibility of

this modern industrial fuel appeals to executives and production men in every type of plant. Whether it is melting huge ingots or annealing the delicate glass and metal sub-assemblies for electronic tubes, there is specialized Gas equipment that is unexcelled for each job.

If you will advise your local Gas Company's Industrial Engineers of your problems in industrial heat applications, and what you are anxious to secure in flexibility, speed, economy, better products, they will, without obligation, offer the best solution.

## **AMERICAN GAS ASSOCIATION**

420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

***THE TREND IS TO GAS***

FOR ALL  
INDUSTRIAL HEATING



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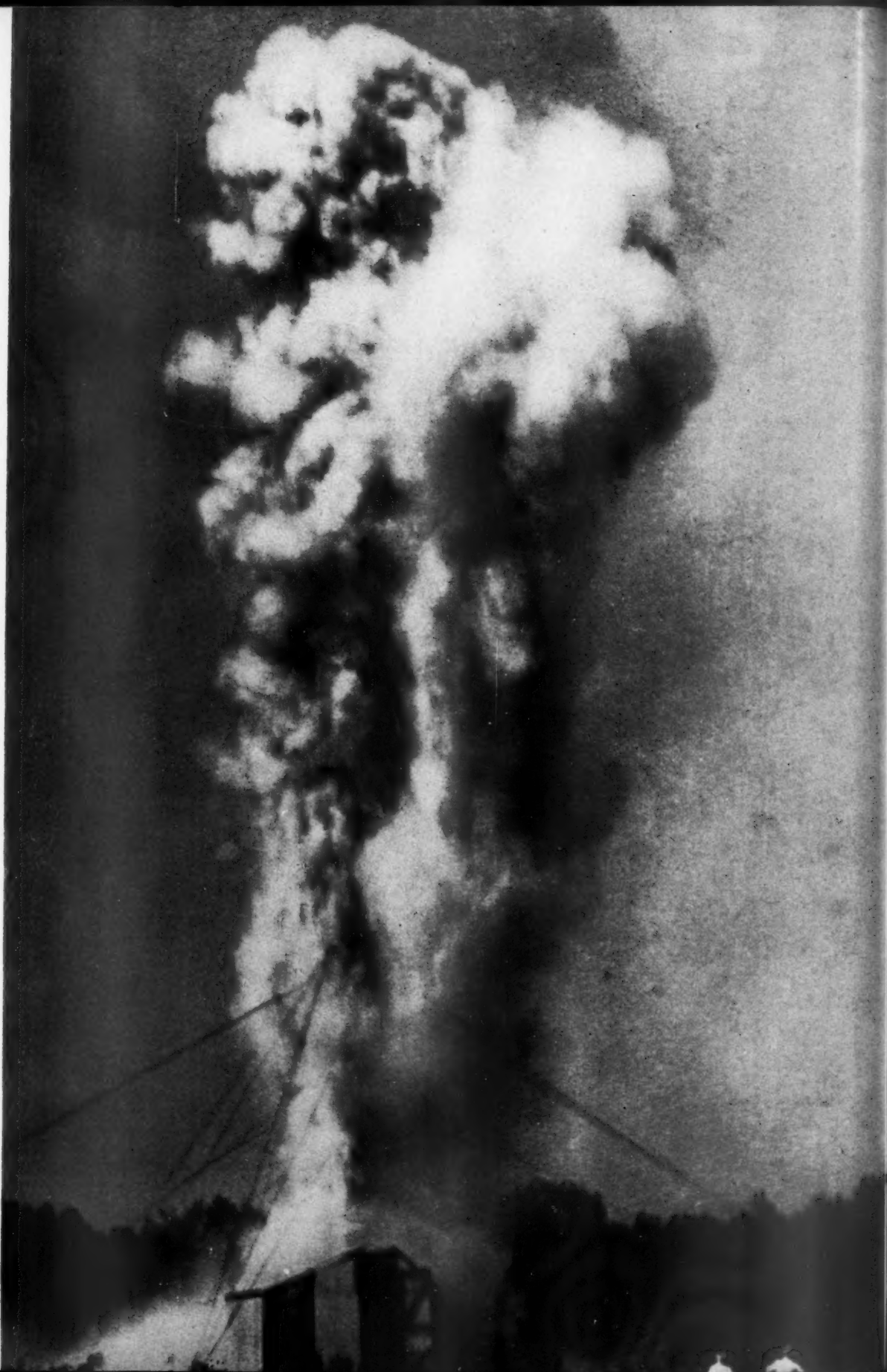
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The gas business has many tangible assets—not the least of which is its record of self regulation in the public interest. For two decades representatives of industry, government and the public have set standards which have governed 95 per cent of all gas appliances in use. Effect of this program on appliance progress is outlined herein. . . . Another asset, and one which has kept the industry young and vigorous, is the character, resourcefulness and energy of the men who operate it. In the field of home planning, none is better known nor more widely respected than Harry Swenson. Always a fountain of inspiration, his article in this issue is no exception. Typically, it combines the soundness of the traditional with the germs of innovation. . . . A third asset has been the ability to produce the right equipment at the right time. With the housewife clamoring for automatic cooking, Bryant steps up with a promising new ignition device. . . . A fourth asset is the ability to turn obstacles to advantage. A current illustration is the study to turn hydrates from a liability to a storage benefit. It's a habit born when the lighting load went across the street!

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JAMES M. BEALL, *Editor*

## Underwriting Gas Appliance Progress

**P**AINSTAKING, day to day research, upon which national appliance standards are based, is in itself spectacular. Yet such standards, built up over the years to ever higher levels of general acceptance by voluntary agreement wield tremendous influence in the evolutionary process of appliance progress.

For more than twenty years the Laboratories' Approval Seal of the American Gas Association has distinguished gas appliances of merit complying strictly with nationally recognized construction and performance standards. Constant strengthening of approval requirements has not only influenced future design, but the process of scientific fact finding upon which the standards are based has proved itself a potent factor in appliance improvement. Impressive testimony to this influence is found in the records of the testing program.

More than 25,000 different models of various commonly used gas appliances and accessories have undergone practical performance tests at the Laboratories since its founding in 1925. It is significant that this assurance of safety, satisfactory performance, and durable construction is now afforded by 95% of all gas appliances marketed.

Laboratories' inspectors travel better than 75,000 miles annually in checking appliances for conformance to national approval standards. More than 25,000 field inspections have been made in factories, sales floors, warehouses and consumers' homes.

Thirty-two sets of national requirements for various classes of appliances and accessories have been developed. Subject to constant revision and improvement under supervision of industry-wide committees on which consumer groups are represented, requirements are American Standard, having been approved by the American Standards Association.

Well over 1,000 separate research reports and 35 printed

research bulletins devoted to fundamentals chart the march of gas industry progress in domestic gas utilization, industrial heating processes, production and distribution, and the formulation of appliance approval standards.

Undoubtedly the wide public acceptance of gas as a fuel is in some measure due to the American Gas Association's foresight and judgment in establishing its own testing and research facilities to carry out its policies early in its history. United support of the whole gas industry in this endeavor not only brought it public recognition as one of the few industries in the nation that had achieved self regulation in the public interest, but continued support resulted in the gradual establishment of the uniformly high appliance standards of today.

How well the American Gas Association has succeeded in winning public confidence in its appliance testing program is illustrated in a new publication of the National Education Association entitled "Using Standards and Labels." The publishers of this booklet rate the A. G. A. as one of the great organizations active in such undertakings and direct attention to the assurances consumers get from seals backed by adequate standards.

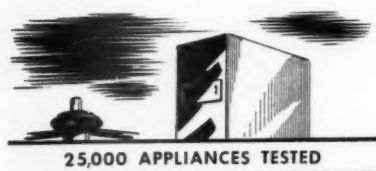
The study group of the education association which prepared this publication describes the gas industry's appliance testing program as an "outstanding case of trade association effort." The Laboratories' Approval Seal is reproduced above this caption: "Famous blue seal for gas appliances. Will you buy those which lack it?"

Pointing out that when standardization and simplification are adopted, the consumer benefits by obtaining both low cost production and distribution and consequently greater value and service, the publication goes on to note that as a



● Opposite: Photograph of a gas well taken a few seconds after it had been shot with 90 quarts of nitroglycerine. Located in Ohio, the well supplies gas to an affiliate of the Columbia Pittsburgh group. More details shown on page 73

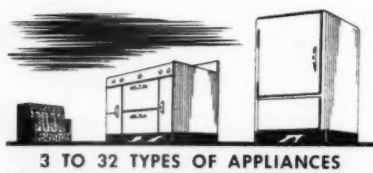
rule the public obtains many indirect advantages. Standardization being a creative process, improvement in quality, greater safety and convenience and economy in use, maintenance, and repair,



all are benefits resulting from such a program which increases confidence among buyers.

The booklet notes with approval the continuous system of field and factory inspections carried out, asking the reader: "What differences in present use of gas appliances do you think there would be if the A. G. A. had not carried out its inspection program? Would all individual manufacturers have been able to provide the same safeguards? Should we have needed more governmental control? Would such appliances be used as widely as they are now?"

These are questions which require no answer from those closely associated with the gas industry but which serve to remind us of those intangible assets which too often are dismissed lightly because they are so familiar. In discussing testing and rating agencies the text brings home to us other intangible assets when it points out that it is hard to truly appreciate how great the benefits from such agencies have been, because so much of the work has been in the background and has produced its results



only indirectly, over a long period of time.

Pertinently, this authority notes that research results not only translate themselves rather naturally into informative advertising, labeling and selling, but that tests devised and standards set up in one agency tend to spread to others. Thus the work of the American Gas As-

sociation Testing Laboratories is interwoven with that of the American Standards Association, American Society for Testing Materials, National Bureau of Standards, and other standardizing agencies.

These points plus the questions asked above are all ones that could be discussed individually as they apply to the American Gas Association and its Laboratories at great length, but their mere statement is enough to remind us of the wisdom with which the Laboratories and the approval program were established and the extent to which they contribute to the forward march of progress as we face the future and the competition of other fuels. Together with the accelerated research, promotional, and advertising campaign inaugurated over a year ago and now in full operation, the gas industry possesses a well-oriented, progressive, and alert leadership which inspires confidence for meeting changing conditions.

The Laboratories' engineers are often asked to predict the shape of things to come, particularly what gas appliances of the future will be like. It would be both futile and foolhardy to attempt to do so, for specific design advances like the development of atomic energy more often than not, are contributed by no

one individual or institution. This is particularly true of the gas industry. The Laboratories working in cooperation with many committees, manufacturers and other institutions, and in turn coordinating its activities with those of total research endeavors, have been and continue to act as a common meeting ground and clearing house for many advances.

Indirect contributions to progress, while not always clearly and specifically definable, are in fact as real and as valuable as say its study of kitchen ventilation, or development of single point flash tube ignition, or the technical exploration of burner design. It was doubtless with such thoughts in mind that Major Alexander Forward upon his recent retirement as managing director of the Association stated that it was unnecessary to say that the Laboratories are a monument to the American Gas Association.



## Lubricants from Natural Gas

NEW SYNTHETIC lubricants containing no petroleum oils, one suitable for use in machinery and in internal combustion engines, were described at the meeting of the Society of Automotive Engineers in Detroit. They are made from natural and other hydrocarbon gases, and are the result of 25 years of almost continuous research.

The report on the new lubricants was made by J. C. Kratzer of the Linde Air Products Company, D. H. Green of National Carbon Company, and D. B. Williams of Carbide and Carbon Chemicals Corporation. The development was conducted at the Mellon Institute of Industrial Research, Pittsburgh, and in industrial laboratories at Tonawanda, N. Y., and South Charleston, W. Va.

One of the new lubricants was described as the LB series, insoluble in water and adapted to lubrication of machinery, including internal combustion engines; the other as the 50-HB series, soluble in water and satisfactory for lubrication of metal, rubber and other materials.

Laboratory and road tests of automotive

lubricants, known as LB-300 and LB-550, were said to show cleaner engine operation because of solvent action, easier starting at low temperatures, and smaller than normal deposits. Tests with military engines were reported to show that the synthetic lubricants assure greater freedom from sludge and varnish formation, better starting and operation in cold weather, and only slightly greater leakage.

The 50-HB series was described as being similar in properties to the LB, equal in lubricity, and completely soluble in water at room temperatures. They are satisfactory, the reporters stated, for use as brake fluids, cutting oils, and textile lubricants.

Outstanding advantage of both these series of new synthetics, they continued, is the possibility of exercising exact control, during manufacture, over viscosity and pour point. The oils are products of American science and industry; they differ chemically from German synthetics, and are said to be superior to them.

# Set the Stage for Home Service

Fundamentals of good kitchen displays and home service demonstration platform arrangements. The right combination should have both good will and sales appeal

BY HARRY SWENSON

*Director, Display and Home Planning,  
The Peoples Gas Light and Coke Co.,  
Chicago, Ill.*



Harry Swenson

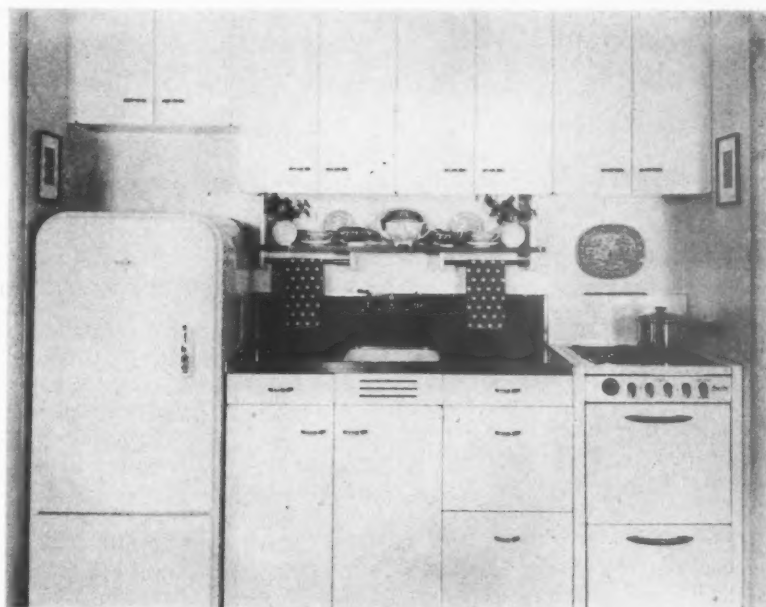
WHEN we of the gas industry speak of modern kitchens we do not mean the kind of kitchen that looks like a super-delicatessen, with all sharp white corners, where you have to look twice to find the range.

Most women when they think of such kitchens are not thinking of tricks and gadgets and square yards of glass and plastic. They will settle peacefully for something less than that.

Most women do, however, share our thinking that one can do with a little more sense in arrangement, more pleasure to the eye and less dull work. In every job there is just so much that is downright chore; most jobs, including my own, are more grind than glamour but kitchen work, we know, need not be a refined form of slavery and we can prove it.

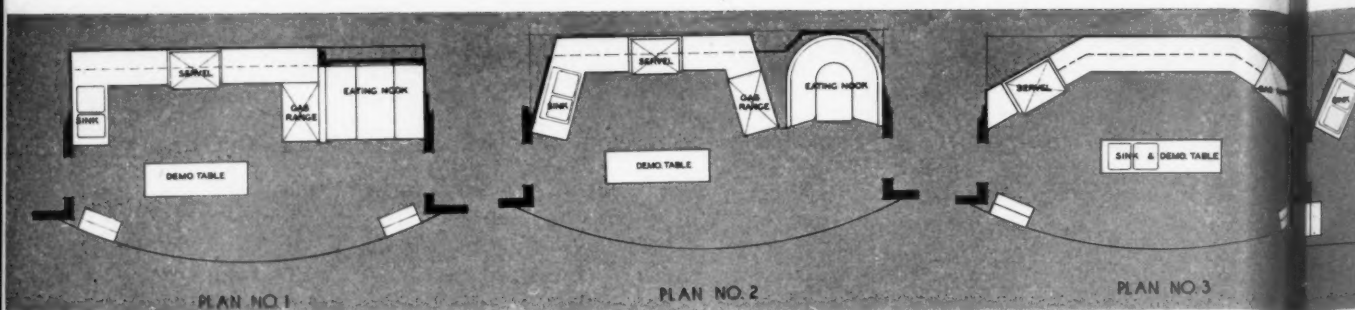
The excellent work Home Service girls do in promoting better meals, better nutrition, better methods, means so much more if women work in a kitchen that cooperates in getting things done and gives the pleasure of achievement and satisfaction in doing it.

We ought to talk kitchens aggressively and authoritatively—as people liking kitchens and knowing kitchens better than anybody else and not as if it were something to take hold of with tongs. But it is no use talking kitchens unless we also show kitchens, looking as they should according to gas industry



Kitchens such as these on the company's sales floor appeal to varying income groups and help sell gas appliances. Above is shown an apartment model while the one below is more elaborate

Address before A. G. A. Home Service Workshop, Kansas City, Missouri, February 4-6, 1946.



Home Service demonstration platforms need modernization to effectively promote postwar gas appliances.

concept—well-styled, color-rich, beautiful.

It happens that a good many kitchen promotion questions are directed to me. One of the most frequent is: "If there is floor space for only one kitchen, what type of kitchen should it be for widest appeal?" In such a case the temptation would be to make a super-duper, out-of-this-world job of it. But the answer is, according to my light, eschew that sort of thing; if you can do but one kitchen do a really good average job that rings true in everything.

### Stress Conversation Points

Avoid exaggeration but imbue this one kitchen with conversation points of every kind. Details to be talked about are better than one overwhelming impact. The sort of kitchen one does in an advertisement is one kind and the one you can actually touch with your fingers is another. Let it be decoratively stunning in a friendly, general-appeal way rather than so unusual that it calls for explanation and maybe apologies. But all the while keep your mind on the fact that its first purpose is to advertise gas and its ultimate aim to sell gas. If then it also sells other things, good and well.

Again when lack of space, interest or economy allows the showing of only one kitchen, supplement it with drawings or illustrations of variations of it; or instead of a complete four-wall kitchen, do two "L"-shaped kitchens featuring both appliances and have drawings tell the arrangement of the missing walls.

One thing to remember is that the gas company serves people of all incomes but the top group doesn't call for our advice and the lower group can't follow it if it does. That leaves the mid-

dle group, the average customer, hence it seems logical to address the kitchens to this group with some variations and a little plus in styling and decoration rather than in elaborateness of construction.

Where possibilities are such that you can show several different types, keyed to different incomes, you have no problem at all, your sailing is clear and the only thing stopping you is lack of ingenuity. But in all cases it is best to stick to general types of kitchens rather than the exception in layout. A brand new idea in layout and construction features may be fun to show and chock-full of talking points but it is also controversial. It is not our job to pioneer

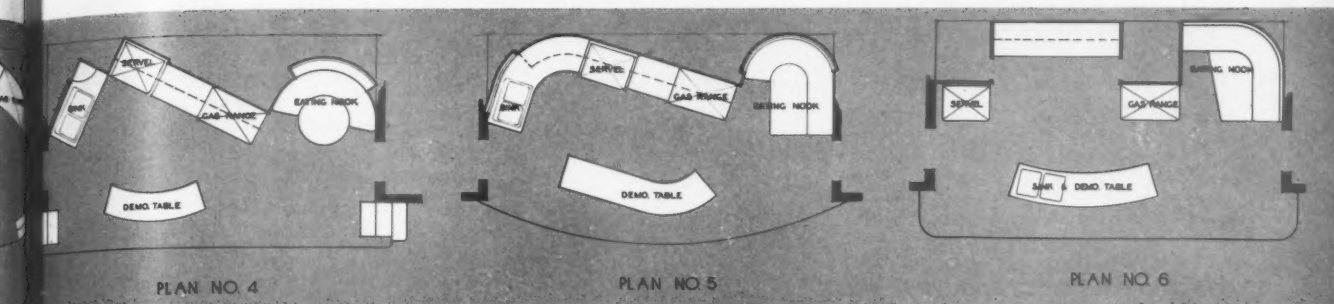
in new design or educate in decoration but rather to sell that which is available and can be had now and above all, sell the idea of gas cooking and gas refrigeration.

One thing I do not think too well solved is that of a logical tie-in of Home Service and kitchen displays. True, I know, that a good many companies have their entire kitchen show associated with Home Service, most often right in the Home Service Department but then, in general Home Service and the kitchens are too remote from the place of sales activity. The closer the live, vibrant activities of Home Service and the kitchens come to normal sales locations, the better.



A kitchen on the Peoples Gas sales floor which has many conversation points





...sited designs, some of which are patterned after New Freedom Gas Kitchens, showing gas equipment to advantage

At Peoples Gas we have an active Home Service show window, smack on the sales floor and this idea has some good in it.

It would be ideal if space conditions would permit having Home Service and Kitchen Planning related—the two make a beautiful pair of sisters, bound to be liked by everybody. Also, we might think of keying up our color front a little, not only in presenting kitchens but in the entire program: Kitchens, Home Service, sales floors. In this day of color there's no excuse for being dull, let's be a little gayer and more adventuresome in color and say goodbye to the drab and dreary. So much of what we do is done under the flag of being

practical, but a good deal of that labeled practical is really prosaic and a good color program, rich and live, can be as practical as a commonplace one.

Arrangement also can stand a bit of study. We may have jelled too solidly in our platform arrangements. Nobody knows better than we do the many limitations forced on us in Home Service platform arrangement. But let's look at it. It would be ideal if the demonstration platform could be set to look like a New Freedom Kitchen in all its beauty and efficiency but after all the platform is a stage, the demonstrator an actress and the arrangement must be such that it facilitates her work and also facilitates the audience's grasp of what's cooking.

In the recent A. G. A. Hot Water Contest papers an idea was presented in regard to platform arrangement that in turn leads to other thoughts. The idea was to arrange the platform equipment so that the sink is at right angles with the back wall; thus bringing into clear view of the audience any action at the sink. I do not think the sink and with it the hot water used should usurp any of the focus that should be directed to the range and its uses, but I see no reason why the sink could not be placed at right angles as suggested or even smack in front as a unit with the demonstration table, if the platform is used exclusively for Home Service demonstrations.

### Platform Arrangement

Many platforms are a little loose in arrangement. A degree of compactness, studied to avoid cramping, may provide a better arrangement, more convenient for the demonstrator, and allow better audience focus. The one problem, of course, is to make any set-up flexible enough to permit the platform to be used for other purposes when required. The thought can be carried further, developing into a fresh concept of platform arrangements.

The nature of demonstration work encourages the idea of seeing the platform in an entirely new light, abandoning the orthodox rectangular arrangement and going into more radical changes, all based on easier work for the demonstrator and better viewing by the audience. While the arrangement may then deviate from typical home arrangement, the decorative treatment can approximate a home kitchen and be as exciting as a New Freedom Kitchen ad, even to the point of incorporating something of (Continued on page 91)



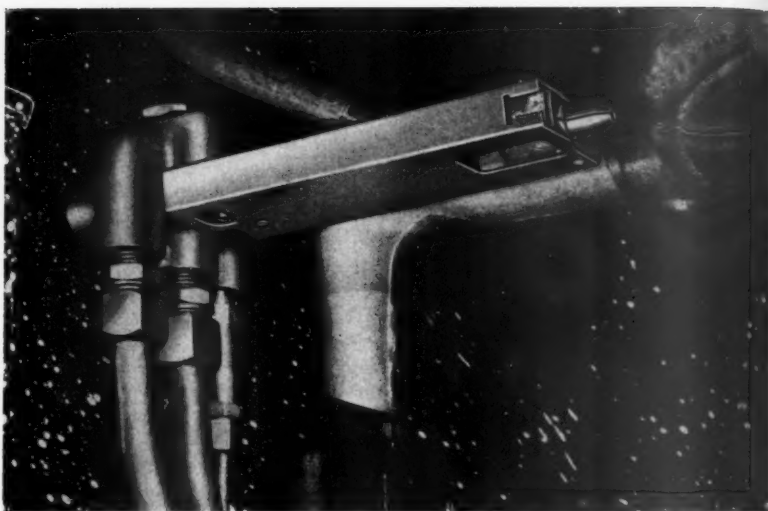
*This kitchen display of traditional design appeals to many home-makers*

# Automatic Ignition Development

New Bryant gas range "lyter" utilizes one basic design adaptable to gas cycling, electric or single-point ignition

BY C. H. CUMMINGS

Manager, Original Equipment Division, The Bryant Heater Co., Cleveland, Ohio



Typical application of Bryant automatic gas range pilot installed in the broiler of a domestic gas range. Used as a constant-burning pilot, the unit and piping are attached to the side of the broiler with the pilot tip in positive alignment with the ignition ports of the burner extension

THE gas range has many advantages over the electric range, but it is apparent that our industry has not featured automatic cooking. The result is that the average present or potential user thinks only of the electric range when she thinks of automatic cooking. Since it is admitted that gas fuel is more desirable for cooking purposes, we have only to make our ranges completely automatic to put us in a favorable competitive position. It is true that we have offered automatic gas ranges to the public, but only in very limited quantities.

To make a gas range completely automatic, we must have an arrangement whereby when the oven burner is turned on, a source of ignition is provided so

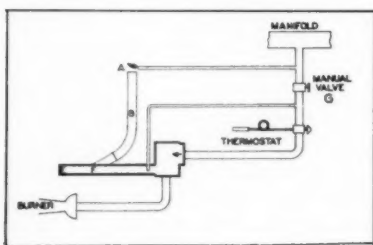
that gas supplied to the main oven burner is lighted. This arrangement must embody a safety feature so that unburned gas cannot flow from the burner into the oven. Such devices should be rugged in construction, fast in operation, require a minimum of servicing, and, of course, be dependable.

With an extensive background of experience in the automatic lighter field and with the dialer compiled through extensive research and development over the past four years, Bryant now offers to the gas range industry, and through them, to the public insisting on automatic cooking devices, a completely new control—the Bryant Range Lyter. This device has one basic design adapt-

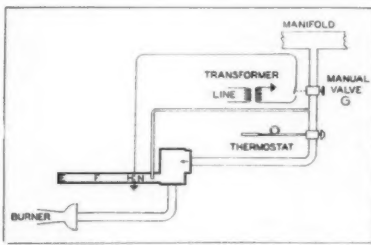
able to the three systems of ignition, namely, gas cycling, electric, and single-point, flash-tube ignition.

With the gas cycling system of ignition, there is a very small constantly burning flame. This flame liberates very little heat into the oven during the off-operation and does not impinge on the thermal element of the device nor keep the safety valve open. The operation of this system is as follows:

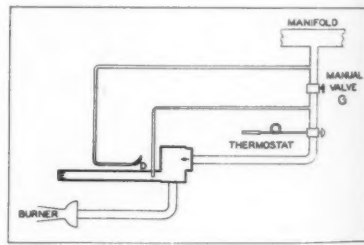
The oven or broiler valve is turned on, gas is supplied to the port of the range "lyter" adjacent to the constant burning pilot and to the valve of the "lyter" where it is interrupted from going to the main burner. Gas supplied to the port of the (Continued on page 91)



Single-point, flash-tube ignition—when a manual valve (G) is opened, gas flows to the gas flash chamber (F) and through a port (C) upward through a flash tube (B) to a constant burning pilot flame (A) where it ignites, flashing down to the tip port (E). The thermostatic element then opens the oven or broiler valve



Electric hot wire ignition—Opening the manual valve (G) completes an electric circuit which energizes the ignition coil (H) installed within the flash chamber (F). A gas mixture from the tip port (E) enters the chamber, reaches the coil, ignites and flashes back to the tip port. The thermostatic element breaks the circuit to the coil as it opens the oven or broiler valve



Cycling gas ignition—a gas mixture from tip (E) enters the flash chamber, reaches the pilot (D) ignites and flashes to the tip port. The thermostatic element then opens the oven or broiler valve





# A Man and A Medal

Since the McCarter Medal was established in 1923 upwards of 800 lives have been saved by heroic acts of employees

IN an era in which so much effort has been directed toward the destruction of humanity, it is refreshing to pause for awhile and recognize the fact that there are men and organizations doing a great deal toward the saving of human lives. One man in particular who has worked endlessly for the preservation of human life during the past two decades is Thomas N. McCarter, who recently retired after a long and distinguished career as president and chairman of the board of Public Service Electric and Gas Company of New Jersey.

Back in 1923, Mr. McCarter generously offered a medal to be awarded to employees of member companies of the American Gas Association for successful resuscitation from asphyxiation by gas. This medal was and is known as the McCarter Medal. The regulations which follow were set down in an attempt to determine who was eligible for the award.

After a case of successful resuscitation from asphyxiation by gas by any employee of any member company of the American Gas Association, an application for the award of the McCarter Medal may be made by an executive officer of any member company to the Executive Board through the Accident Prevention Committee of the Association, upon its prescribed form. (Copies of this form have always been available at Association Headquarters.)

Mr. McCarter has always been intensely interested in stimulating knowledge and use of the Schafer Prone Pressure method. Therefore, the medal is awarded only for resuscitation from gas asphyxiation by the prone pressure method. A certificate, carrying a description of the accident and the service rendered, is presented to the life saver with a medal, and additional certificates are given at the same time and place to each employee who has, in the estimation of the Accident Prevention Committee, rendered sufficient assistance in the resuscitation.

In the event that an employee performs two or more successful resuscitations in accordance with these foregoing regulations, there is awarded to that employee in the same manner that the medal was awarded, an engraved bar properly attached above the original medal.

At one of the annual conventions a few years ago, Mr. McCarter said: "In establishing the award which bears my name, I hoped it would encourage all gas people to save human lives by learning the prone pressure method of resuscitation. I like to think that the original purpose of the so-called McCarter Medal has been realized.

"It is naturally a matter of great pride to me that the award was the official recognition of the gas industry for the highest form of service any man can render—the saving of human lives.

"In these days when nations are bending every effort to devise new and more terrible ways and means to destroy lives, it seems somewhat gratifying to participate in a movement, small in comparison though it may be, the principal object of which is to save human life."

There is no doubt about the fact that the purpose of the McCarter Medal has been realized. Since its inception, a total

of 778 McCarter Medals have been awarded. In addition to this, 48 McCarter bars and nearly 300 certificates of assistance have been awarded. This means that more than 800 human lives have been saved by employees of member companies of the American Gas Association and their heroic acts have been officially recognized.

In 1939 the McCarter Medal and bar were awarded for the first time to a man who had revived two people simultaneously from asphyxiation by gas, which

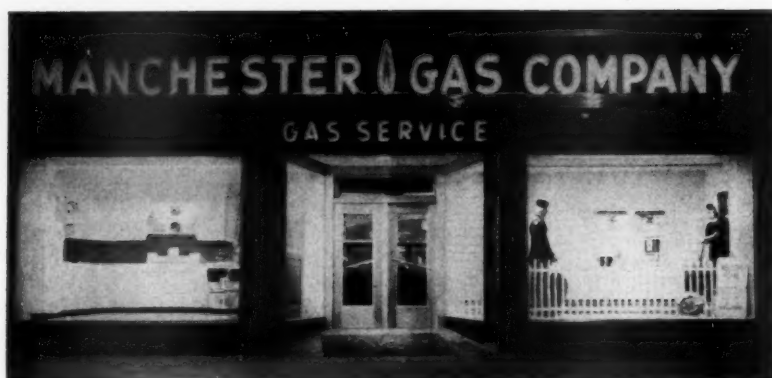


Thomas N. McCarter

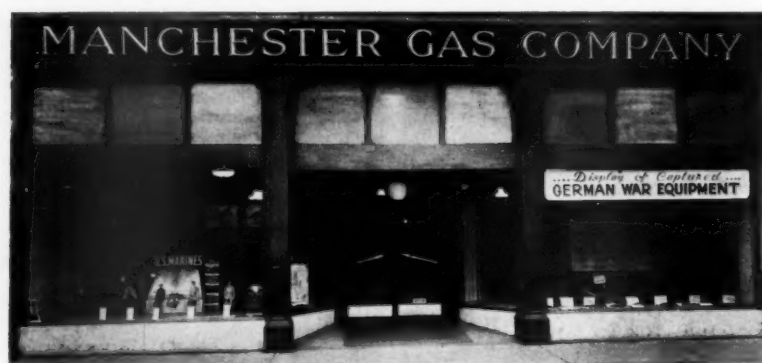
was proclaimed by Mr. McCarter as an extraordinary feat.

Not only have servicemen qualified for the McCarter Medal, but the records show that executives as well as linemen, chauffeurs, foremen, fitters, auditors, meter readers and many others have won this highly coveted award.

The presentations of McCarter Medals at company meetings and the conventions of the American Gas Association have always been an impressive and inspiring sight. Mr. McCarter is justifiably proud that each medal awarded signifies the saving of a human being. Possession of a medal is gratifying not only to the person who has been instrumental in saving that human life, but it is a source of pride to the company employing the recipient.



After modernization—New features include Neon-topped store front with simulated gas flame



Before—This old-fashioned store front did not place gas appliances in an attractive light

MANCHESTER Gas COMPANY 210 GILLET MANCHESTER NEW HAMPSHIRE						MANCHESTER Gas COMPANY CASHIER'S COUPON					
<p>Office Hours: 8:30 A. M. to 5:00 P. M.            Thurs. 8:30 A. M. to 5:00 P. M.            Sat. and Sun. 9:30 A. M. to 12:30 P. M.</p>						<p>SEP 24 1945-9</p>					
<p>FROM TO PRESENT PREVIOUS CODE GAS USED DESCRIPTION GROSS NET</p>						<p>SEP 24 1945-9</p>					
<p>Pay (NET AMOUNT ON OR BEFORE) (GROSS AMOUNT AFTER)</p>						<p>Pay (NET AMOUNT ON OR BEFORE) (GROSS AMOUNT AFTER)</p>					

The re-designed gas bill, shown here, combines attractive lettering with two-color gas flame

MANCHESTER GAS COMPANY 210 GILLET STREET MANCHESTER, NEW HAMPSHIRE						MANCHESTER GAS COMPANY CASHIER'S COUPON					
<p>Office Hours: 8:30 A. M. to 5:00 P. M.            Thurs. 8:30 A. M. to 5:00 P. M.            Sat. and Sun. 9:30 A. M. to 12:30 P. M.</p>						<p>SEP 24 1945-9</p>					
<p>FROM TO PRESENT PREVIOUS CODE GAS USED DESCRIPTION GROSS NET</p>						<p>SEP 24 1945-9</p>					
<p>Pay (NET AMOUNT ON OR BEFORE) (GROSS AMOUNT AFTER)</p>						<p>Pay (NET AMOUNT ON OR BEFORE) (GROSS AMOUNT AFTER)</p>					

The old type gas bill is typical of many in the gas industry—serviceable but not modern

# Manchester Points the Way

In Cinderella fashion, a New England gas company sheds its ancient raiments for an impressive new modern exterior

BY EDWARD NIEDERER, JR.

Manager, Manchester Gas Company,  
Manchester, N. H.

MANCHESTER Points the Way" is an apt title for the story of what has been happening to the Manchester Gas Company in the way of modernization and in the launching of an aggressive advertising program.

On October 15, 1945, the store front and showrooms of the Manchester Gas Company were as shown in Fig. 1. On December 20, 1945, they were as shown in Fig. 2. The management of the Manchester Gas Company laid its plans for modernization and aggressive advertising before the end of World War II. Thus, when the war had ended, the actual plans were on paper. No time was lost in executing these plans, thereby making the Manchester Gas Company the first gas company in New Hampshire—and perhaps in New England—to launch such a complete program with an eye on the potential postwar business.

## Store Front

In Cinderella fashion, the staid, uninspiring front was changed into one of eye-attracting black glass, topped with a Neon sign. As may be expected, the sign includes a simulated gas flame, done in various shades of blue. The entrance doors which had been in use for many years, but which were still in very good condition, were brought up to the best in 1946 standards by a covering of stainless steel.

## Show Windows

The lighting is the very "last word" in showroom lighting, being the indi-

rect type of flush lighting designed by outstanding experts on modern lighting. This is the only installation of its kind in Manchester, and in addition to the beauty and efficiency of indirect lighting, contains the added feature of flush movable spotlights; thus any part of the showroom may be spotlighted, a feature which makes the gas company's the outstanding showroom on "Main Street."

### New Freedom Gas Kitchen

What is believed to be a new idea in display is a full size New Freedom Gas Kitchen right in the showroom window. The kitchen extends from the showroom window at the sidewalk back into the showroom area inside the building. There is an archway and a plate glass window in the kitchen inside the building, thus making it possible to not only see the kitchen from inside the building as well as the outside, but allowing one to enter and inspect its features.

This kitchen was designed for the absolute convenience—the absolute "New Freedom"—of the modern housewife. It contains the latest "CP" gas range—complete with condiment set, timer and light—the sort of a cooking range that assures the user of perfect results—and a six-foot gas refrigerator. Hot water is supplied to the sink from the latest in modern automatic gas heaters. In short, the kitchen contains every piece of gas equipment to make light the homemaker's task—to bring her the new freedom of gas service—to make her kitchen as new as tomorrow!

The cabinets, sink, pyrex-ware and furniture were supplied by many of Manchester's retail stores; it is the furnishing of this equipment which forms an integral part of the Manchester Gas Company's over all plan. The gas company informs interested people of the source of this equipment, under a plan worked out with the various dealers—something new in displaying equipment—in such a way that it is, in effect, an additional showroom for other business men selling all types of kitchen equipment.

### New Bill

Another innovation brought to Manchester's attention, coincident with the opening of the New Freedom Gas

Kitchen, was the new gas bill, which is at once more eye-appealing (as to color and design) and more easily read than the old one which was in use for many years. For comparison, photostatic copies of the old and a sketch of the new bill are shown in Figs. 3 and 4.

### Open House Held

At the ceremonies announcing to the City of Manchester the New Freedom Gas Kitchen, the company employed the use of radio. The Manchester Gas Company "went on the air" over local Radio Station WFEA with a special half-hour program dedicated to its kitchen and modernized entrance.



*A feature of the Open House ceremony was the presentation of a gas range to a lucky ticket holder. Here the winner, Arthur Lefebvre, receives his prize. Left to right: Warren A. Bodwell, president, Chamber of Commerce; Mrs. Benoit; Edward Niederer Jr., manager and treasurer, Manchester Gas Co.; Mr. Lefebvre; and Mayor J. T. Benoit*

The residents of the city were advised of the new program by short "spot" announcements over the air, as well as a newspaper campaign, in advance of the actual program, so that the unveiling activities were well attended. Principal speakers on the program were: Edward Niederer, Jr., manager of Manchester Gas Company; Warren A. Bodwell, president of the Chamber of Commerce, and his honor, Mayor Josephat T. Benoit, who did the actual "unveiling" of the store front and the New Freedom Gas Kitchen. Music was furnished by a four-piece orchestra.

A visible gas toaster was given free to every adult attending the dedication exercises.

Prior to the "opening night" tickets were distributed among the residents of the city for a grand prize of a gas range that was awarded during the program. Mrs. Benoit, wife of the Mayor, pulled

the stub which awarded the grand prize of a gas range to Arthur Lefebvre of 20 Hanover Street.

### Radio Program

Radio representation was continued by the Manchester Gas Company when, on the following Sunday at 1:15 to 1:30 P.M., it started sponsorship of a series of radio programs called "Come and Get It" over WFEA.

The program is a food quiz radio show recorded by NBC's radio-recording division, M.Cd. by showman Bob Russell, involving a studio audience and starring Alma Kitchell (who has established a nation-wide reputation

with her homemaker programs), and Gaynor Maddox (who has spent a lifetime in following the science of nutrition and whose syndicated articles on food reach 15,000,000 people).

This series is to run for a full year, and will, from time to time, be augmented by special "spot" announcements as the need arises.

### Dealer Cooperation Plan

Recognizing that the main purpose of the Manchester Gas Company is the promotion and sale of gas—and to further promote the good will of the public and maintain the high standard of service that the Manchester Gas Company has always offered its customers—it follows that one of the most important ways to accomplish this is to see that only quality appliances are installed on its lines which will assure safe, efficient and dependable service.

Therefore, the company instigated a Dealer Cooperative Plan wherein the various retail stores interested in the sale of certified high-type gas equipment are urged to participate.

Briefly, the plan is as follows: Dealers will buy gas appliances for their displays. No stock will have to be carried by the dealer. When a dealer sells an appliance to a customer, he notifies the company. The company will take the appliance from its storeroom, deliver

and connect it in the home of the customer. The dealer will be billed for the appliance, less a fixed dealer's discount. In the case of plumbers who wish to connect or deliver their own appliances, an additional discount is allowed. The company assumes the responsibility of all servicing, both during and after the warranty period and makes no distinction regardless of where the appliance was purchased.

## Snow Removal from Driveway by Gas

A PITTSBURGH physician, Dr. Ralph G. Fabian, often hindered in making emergency calls during the winter by his snow- and ice-clogged driveway, has found the solution to his problem by installing an underground snow melting system consisting of wrought iron pipe coils embedded in the driveway concrete and supplied with hot water from a gas-fired boiler. During the latter part of December, nearly fifteen inches of snow fell in Pittsburgh, but not one flake stayed on the doctor's driveway.

Previous engineering experiences with similar snow-removal installations revealed that approximately one hundred B.t.u. per hour per square foot of surface is the heat output required to melt 1" of snow per square foot per hour. Since the gas boiler, used exclusively by Dr. Fabian for snow melting, supplies 175,000 B.t.u. per hour, taking heat losses into consideration, and the driveway surface contains approximately 750 square feet, the resultant output was adequate to handle a heavy snowfall.

Detailed engineering investigations into the possibilities of snow-melting by means of underground warming of airport runways or taxi strips have indicated that the initial in-

vestment for installation would be approximately thirty cents per square foot. Both military and civilian aeronautical authorities are reported to have taken a keen interest in the economical and functional possibilities of snow-removal systems.

## Dealers To Display Complete Kitchens

A MARKED trend toward complete kitchen displays is shown in a recent survey conducted by Edison General Electric Appliance Company, Inc., which disclosed that complete kitchen installations will be handled by 89% of the electric appliance dealers questioned.

This change in merchandising technique is "the greatest single new development in post-war refrigeration selling," according to Floyd M. Slasor, manager, refrigerator sales division. Figures showed that while 90 per cent of those answering will install complete kitchens for consumers, approximately one-half will display complete operating kitchens in their showrooms.

## New Freedom Kitchens Offered as Prizes

SERVEL, Inc., Evansville, Indiana, is participating in the new Private Life contest sponsored by Glamour magazine for "any girl with a job," it is announced by R. J. Canniff, advertising and sales promotion manager for Servel.

In this contest, the purpose of which is to stimulate a private life for American working girls, the two first prize winners will each receive a private living suite built by Glamour in her family's home, each at a cost of more than \$10,000 in construction, furnishings, and equipment.

"Here at Servel," Mr. Canniff said, "we were quite delighted that gas was chosen for these very fine modern living suites. We are glad to be able to supply the Servel-designed New Freedom Gas Kitchen for this contest."

## Promotional Committee Has New Members



R. A. Malony

NEW members have been appointed to the recently-organized Promotional Committee of the American Gas Association, it has been announced by Everett J. Boothby, president of the Association. Chairman is D. A. Hulcy, president, Lone Star Gas Company, Dallas.

Among the new appointees are R. A. Malony, The Bridgeport Gas Light Company, who has been selected as vice-chairman; C. E. Muehlberg, Consolidated Edison Company of N. Y., Inc.; D. P. Hartson, chairman, National Advertising Committee; Lyle Harvey, chairman, Promotional Committee, G. A. M. A.; J. J. Quinn, chairman, Residential Gas Section; H. P. Sutton, chairman, Industrial & Commercial Gas Section.

Other members of the committee are: O. R. Doerr, Pacific Gas & Electric Co., San Francisco; J. N. Greene, Alabama Gas Co., Birmingham; W. M. Jacobs, Southern California Gas Co., Los Angeles; D. H. Mitchell, Northern Indiana Public Service Co., Hammond; I. K. Peck, Binghamton Gas Works, Binghamton; R. J. Rutherford, Worcester Gas Light Company, Worcester; F. C. Smith, Houston Natural Gas Corp., Houston; H. P. J. Steinmetz, Public Service Electric & Gas Company, Newark; J. H. White, Jr., American Gas Association; E. J. Boothby, Washington Gas Light Company, Washington, D. C.; P. T. Dashiell, chairman, Gas Production Research Committee; R. H. Hargrove, chairman, Natural Gas Department; E. P. Noppel, chairman, Coordinating Committee on Research; H. W. Reed, chairman, Manufactured Gas Department; C. A. Tattersall, chairman, Publicity Committee.



Resting on a 4-inch crushed rock fill, this grid of wrought iron pipes was embedded in concrete to form a heating element for the sloping, snow-melting driveway of a Pittsburgh physician's residence. Water heated in a small gas-fired boiler supplied the heating system.





Booklets which supply ammunition for the merchandising program



Step number one in the quick-getaway plan is to appoint a Home Planning Bureau director

## ABC's of Quick-Getaway Plan

All-gas merchandising program built around a home-planning bureau established with the cooperation of local institutions

MANY gas utility men are talking about the Janitrol Quick-Getaway Plan. Several gas companies are arranging to put the plan into effect in their communities, some starting immediately, others in March to June. Others are studying its adoption as the hub for their merchandising activities. Because of the widespread interest, the plan is summarized here for the benefit of those gas utility executives who were unable to attend one of the series of regional meetings held last fall by the Residential Gas Section of the American Gas Association.

The merchandising plan is built around a home planning bureau established by the local gas company with the cooperation of architects, builders, department stores, supply houses, building loan institutions and the other key factors in the building industry. Surface Combustion Corporation, Toledo, O., manufacturer of Janitrol gas-fired heating equipment, prepared the Quick-Getaway Plan with the assistance of some of the country's most prominent home planning authorities.

The plan can be effectively utilized by a gas utility to increase gas load whether it sells direct, operates as a co-operative dealer or depends entirely upon supplementary outlets for distribution. It can be used by any size com-

pany in any size community and may be modified and utilized by merchandising dealers.

The millions of American families planning to build, buy or remodel houses during the next few years, and the millions more who simply intend to buy new appliances, are eager for home building information, according to reliable surveys. The gas company which will undertake to furnish the public with the information it wants—not just on gas appliances, but on every phase of home building—can become the community's home planning headquarters.

The Quick-Getaway Plan provides gas companies with the vehicle for establishing merchandising leadership in the sale of gas appliances for cooking, refrigerating, water heating, house heating and air conditioning. It is a "natural" for presenting the story of the All-Gas Home, and most gas companies believe that the story must be told well and frequently if gas is to win its rightful place in the coming competition between fuels.

Many excellent ideas have been developed to assist the industry, but the rare virtue of the one embraced by the Quick-Getaway Plan is that the idea has been worked out in detail, wrapped up in a complete package ready for the gas companies to put into effect now with



**NOW YOU'RE READY FOR ACTION!**

Next—get out your pencil and determine your appropriation. Then you are ready for action



Final step is to set up Home Planning Bureau which is the hub for all promotional activities

limited manpower and equipment, and to expand as conditions justify.

The A B C's of the plan are as simple as that. The first steps are to appoint a bureau director, determine the appropriation and set up the home planning bureau as the hub for promotional activities in selling the All-Gas Home. Then



Information booth for home planning bureau was designed and built by Diorama Corp.

put the bureau to work. Surface Combustion has published "Organizing, Operating and Promoting a Home Planning Bureau" as a guide to gas utility companies. Sample publicity, advertising and radio programs have been prepared and are available as well as an instructive sound slide film on the subject.

Keeping interest alive after the bureau is in operation is important to its success. Four miniature scale model homes for display purposes and Plan-O-The-Month mailing folders serve as a starter. These may be followed with announcements on the booklet "Heat for Real Living," the Home Planning Check List and the impressive and informative book, "Let's Plan A Peacetime Home."

The latter is a 114-page home planning book packed with helpful information. The authors are four nationally prominent home planning authorities who point out the main considerations in planning a home. Architects, home economists, builders and other qualified critics have warmly commended "Let's Plan A Peacetime Home" as practical and interesting reading for the family planning to build a home. More important, perhaps, is the high praise

which has come from those home planners who have read the book. It is probably the outstanding single promotional piece prepared by Surface Combustion for the home planning bureau package.

Printed matter designed to attract the people who make up the mass market for homes includes the "15 Small Homes" booklet and a discussion of the G.I. Bill of Rights.

Not forgetting the importance of co-operation from the men with direct influence on the purchase of gas appliances, the company is preparing a group of A.I.A. folders for architects and builders, a merchandising guide which will prove of assistance to operative builders in establishing better appreciation for the value built into their product, and a guide to better cooperative sales programs for the utility and participating dealer.

That is the material prepared and put into the Quick-Getaway Plan package. It will serve a utility in putting a home planning bureau in motion and keep it rolling. It can and doubtless will be supplemented by the gas company with material from other manufacturers as well as from local architects and builders.

The program provides a utility with

## It's the Flame That Gives It Flavor

The other day J. I. (Jim) Gorton, "CP" Promotional Director of Gas Appliance Manufacturers Association, dropped in at A. G. A. Headquarters and proudly announced:

"Here's a slogan that clicks—'It's the Flame That Gives it Flavor.' Let's boost it."

We are, Mr. Gorton—right here and now. Who will be next?

a basic plan for selling gas for all major services, is a goodwill builder with the public and the building industry and capitalizes on the tremendous interest in home building. It is a comprehensive and effective "all gas" merchandising program and Surface Combustion has submerged its interest in promoting only the sale of gas heating to the best interests of the gas industry as a whole.

## Consolidated Edison Co. Rejoins A. G. A.

THE Consolidated Edison Company of New York, Inc. has rejoined the American Gas Association and the Edison Electric Institute after an absence since 1942.

Clarence L. Law, vice-president of Consolidated Edison, described the move as part of the company's postwar program.

"The company feels that its key people should be active in committee work and co-operate with representatives of the gas and electric industry throughout the country," said Mr. Law. "Such contacts, curtailed by travel restrictions and other influences of the war period, will be important to the company in its postwar expansion program."

"This is a further step in our postwar association activity, adding to what we have been doing such as supporting the advertising program of the electric utilities and the research program of the American Gas Association."

## Ventilating System Described in "Forum"

FOLLOWING an investigation last fall, the *Architectural Forum* has published in its January issue a report on the Rochester plan of venting New Freedom Gas Kitchens. Under the heading "Ventilating System for Gas Ranges Achieves Cooler, Cleaner Kitchens," the article points out that experiments conducted by the Rochester Gas and Electric Corporation "resulted in a new system which combines room and stove ventilation."

Such a system, the article continues, "pulls vapors off the immediate region where they are produced, mixes them with hot combustion gases, and conducts them out through insulated piping. Thus greases are kept hot enough to remain vaporized until vented out. The crux of the system is the forced ventilation of the top, oven and grill of the range."

There follow further details and diagrammatic sketches of the process. It is also reported that two range manufacturers will equip certain models of their first production with the necessary back, damper, etc., to apply the system and that another manufacturer is producing a package unit for the ventilating system.

The A. G. A. MONTHLY carried an article describing the system in October, 1944.



# Hydrate Storage of Natural Gas

A method for determining the ratio of hydrocarbon to water in a solid hydrate of a normally gaseous hydrocarbon, and its possible application to propane hydrate

This paper† is the first publication resulting from the study of the possibilities of storing natural gas as hydrate, initiated when I was chairman of the Division of Education and Basic Research at the Institute of Gas Technology. The research described in the paper had a primary purpose not stated in the paper itself—to contribute to the education of the junior author, in accordance with the Institute's first basic objective "to train personnel for the Gas Industry."

Benjamin Miller

BY BENJAMIN MILLER\*  
AND ERWIN R. STRONG, JR.

*Institute of Gas Technology, Chicago,  
Illinois*

before the gas entered the transmission line so as to eliminate condensation of water in the line, and thereby the need for drips as well.

The method of water removal chosen was to cool the gas at the outlet of the natural gasoline plant, where the pressure was highest, to a temperature which should be substantially as low as any temperature which the gas was likely to have during its journey to Chicago. The thought was that any water vapor which did not condense under these conditions would not condense at lower pressure in the pipeline. Accordingly, a refrigeration plant was built in which the gas was to be passed over chillers within which liquid propane would boil under a pressure controlled to keep the outlet gas temperature at 38-40 F. The chilled gas then would pass through a heat exchanger where it would serve to precool the incoming gas.

## Hydrate Formation

It was expected that water would condense in the heat exchangers and chillers and be drawn off through drips provided for the purpose. However, after the plant was placed in operation, no water came out of the drips; and the pressure drop across the refrigeration plant gradually built up as a solid formed in the heat exchangers and chillers. Since the minimum temperature to which the gas had been exposed was above the freezing point of water, the solid was not ice. (Minimum propane temperature was 33 F.) However, it did contain water, because the water vapor concentration in the gas leaving the refrigeration plant was much lower than

it was in the entering gas. Investigation showed that the water reacted with something in the gas to form a solid, and the reaction could take place at temperatures as high as 52.5 F. under the conditions that obtained in this plant.

Search of the literature revealed that many gases react with water to form solid compounds called gas hydrates, and methane and ethane are among gases which had previously been reported to form hydrates.

When the experimental work done to determine the cause of the pressure build-up in the water-removal plant of

the Texas-Chicago line became known throughout the natural gas industry, it appeared that many pipeline stoppages, which had not previously been

explained, could now be laid to the formation of gas hydrates. A program of research was started as a cooperative effort of the American Gas Association and the United States Bureau of Mines, and much was learned about hydrates. This research was directed toward preventing pipeline stoppages and development of remedial measures.

The volume of a quantity of gas hydrate is very much less than the volume of the gas from which the hydrate was formed. This fact suggested to several people that natural gas might be stored in the form of hydrate at low pressure and low temperature. M. E. Benesh obtained a patent entitled, "The Use of Gas Hydrates in Improving the Load Factor of Gas Supply Systems" (U. S. Patent No. 2,270,016, issued January 13, 1942). Because of the importance to the natural gas industry of the load factor of gas transmission lines, the Institute of Gas Technology included in its research program a study of the possibilities of storing natural gas as hydrate.

Presented by

CHEMICAL  
COMMITTEE

DR. CHANNING  
W. WILSON  
Chairman

IF it should eventually prove that storage of natural gas as hydrate is economically feasible, the natural gas industry will have turned a handicap into an advantage. That natural gas or natural gas components can react with water to form solids under conditions which frequently exist in long transmission lines is now common knowledge in the industry. The deleterious effect which can be caused by the reaction, and means to keep the reaction from taking place, are also well known. The possibility of turning the reaction to use has not been so generally discussed, though there is mention of it in the literature of the industry.

Even before the solid-forming reaction had been brought to the attention of the industry it was known that water in natural gas could make trouble. In the construction of high pressure natural gas transmission lines it had early become standard practice to install drips at low points in the line to remove water condensed from the gas. There were disadvantages connected with locating and installing drips and in removing water from them at intervals. These disadvantages prompted the engineers engaged in designing the pipeline from Texas to Chicago to decide to remove most of the water vapor from the gas

\*Present address: 70 Pine Street, New York 5, N. Y.

†This is an abridged version prepared by Mr. Miller for the A. G. A. MONTHLY. The complete paper will appear in the 1945 A. G. A. Proceedings which will be published in the Spring of 1946. Copies of the complete paper in pamphlet form can be obtained from the Association on request.

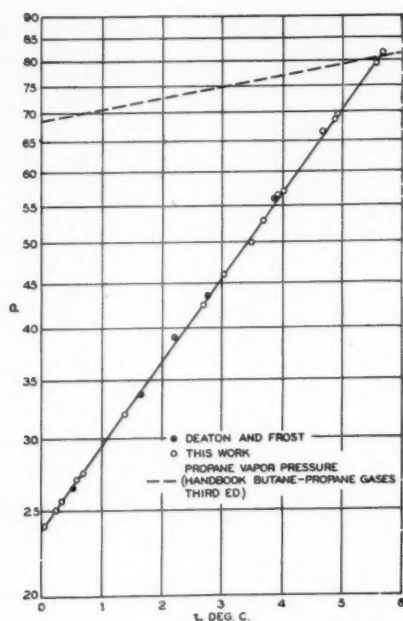


Fig. 1. Decomposition pressure-decomposition temperature relationship for propane hydrate in equilibrium with propane vapor and liquid water

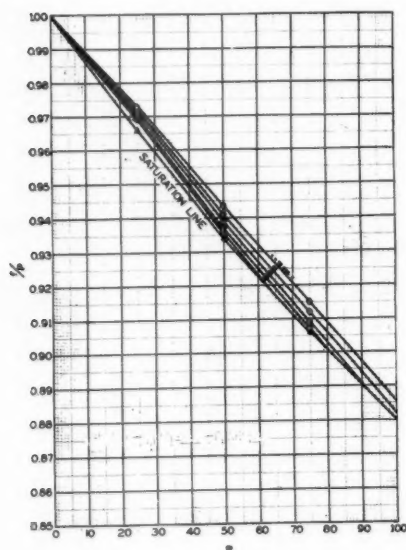


Fig. 2. Ratio of fugacity to pressure for propane vapor as function of pressure for several temperatures

One of the things which must be known, in order to estimate the cost of storing gas as hydrate, is the number of cubic feet of gas which can be stored in one cubic foot of storage space. This is dependent on the ratio of the quantity of water to the quantity of hydrocarbon in the hydrate. Accordingly, the first

phase of the research program was directed toward determining this ratio, using a method which had not previously been used, but which appeared to offer certain advantages.

Previous work had established that methane, ethane and propane formed hydrates, though the formation of hydrates of the higher paraffin hydrocarbons has not been established. Each hydrate has a characteristic decomposition pressure-decomposition temperature relationship; that is, if the hydrate be in a chamber maintained at constant temperature and the pressure of the reacting gas in the chamber be reduced below the characteristic value, decomposition will take place. Similarly, if the gas pressure in the chamber be maintained constant, and the temperature of the chamber be increased above the characteristic value, decomposition will take place. So long as the hydrate is in equilibrium with water and the gas, there is one and only one pressure corresponding to each temperature.

Each hydrate has a critical decomposition temperature, that is, a temperature above which it cannot exist. This temperature is higher for methane than for ethane and higher for ethane than for propane. At a temperature at which all three hydrates can exist, the equilibrium pressure is highest for methane and lowest for propane.

While the critical decomposition temperature and corresponding pressure for propane hydrate had not been determined, it could be estimated, on the basis of previous work, that the critical decomposition pressure would be less than 100 psia. It was, therefore, decided to start the investigation by attempting to determine the composition of propane hydrate; this, it was thought, could be done in relatively simple, inexpensive equipment. If the method proposed should be found applicable to determination of the composition of propane hydrate, it might then be tried on the hydrates of methane and ethane where higher pressure would have to be used.

Previous work in this field has been summarized by Roberts, Brownscombe and Howe (3), who themselves determined the composition of methane and ethane hydrates by a method ascribed to De Forcrand. While this method is thermodynamically sound, it is extremely sensitive to slight experimental errors

and can yield the composition only at the single temperature close to 32 F. at which solid water, liquid water, hydrate and gas can exist in equilibrium.

The reaction between propane and water to form hydrate may be written:



Then the problem may be stated as the determination of  $n$ , the number of mols of water which react with one mol of propane.

If propane, water, and propane hydrate are together, and in equilibrium, the equilibrium relationship can be expressed in accordance with the law of mass action as

$$[aC_3H_8][aH_2O]^n = k[aC_3H_8 \cdot nH_2O] \quad (3)$$

where  $aC_3H_8$  means the activity of the propane,  $aH_2O$  means the activity of the water, and  $aC_3H_8 \cdot nH_2O$  means the activity of the hydrate. Since the hydrate is solid, its activity is essentially constant at constant temperature.

The activity of the propane may be taken as equal to its fugacity, and this is determined principally by the total pressure on the system and the temperature, since the water vapor concentration will always be so small that the vapor phase may be considered to be pure propane. If liquid water is present, its activity may be taken as 1, since the solubility of propane in water is so slight that water saturated with propane may be considered to be pure water, especially in the absence of liquid propane. Generally speaking, liquid water and liquid propane cannot both be present in equilibrium with propane hydrate; there is only one temperature at which they can, the critical decomposition temperature.

### Propane Gas Added

It is possible to have the quantities of water and of propane in the chamber so proportioned that there will be present at equilibrium only propane vapor, water vapor, and solid propane hydrate. If now propane gas be added, which will require increasing the pressure, more hydrate will form, and the water vapor content will have to decrease. But the pressure cannot be increased indefinitely, because eventually the vapor pressure of liquid propane will be reached, and any additional propane will condense. Then the activity of the propane will be that of pure liquid propane, since the amount of water dissolved in the liquid propane is negligible under these conditions.

If, instead of adding propane gas, water vapor be added, only a slight amount can be added before saturation with respect to water will occur; any further addition will require that liquid water be present. While that small amount is being added, more hydrate must form, and the propane concentration in the vapor space will have to decrease.

There are thus really two limiting decomposition pressures for propane hydrate: at each temperature at which it can exist. One is the minimum water vapor partial pressure, which occurs when liquid propane is present also. This is the equilibrium water vapor pressure which exists in a space containing liquid

\* For Equation (1) the complete paper should be consulted.

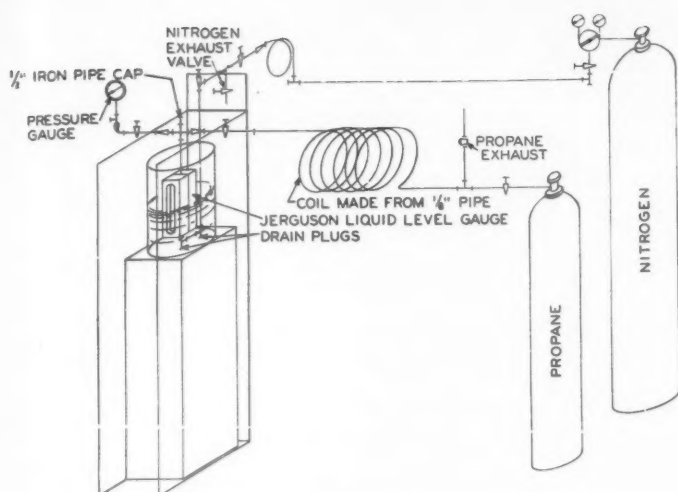


Fig. 3. Diagram of the apparatus used to study propane hydrate

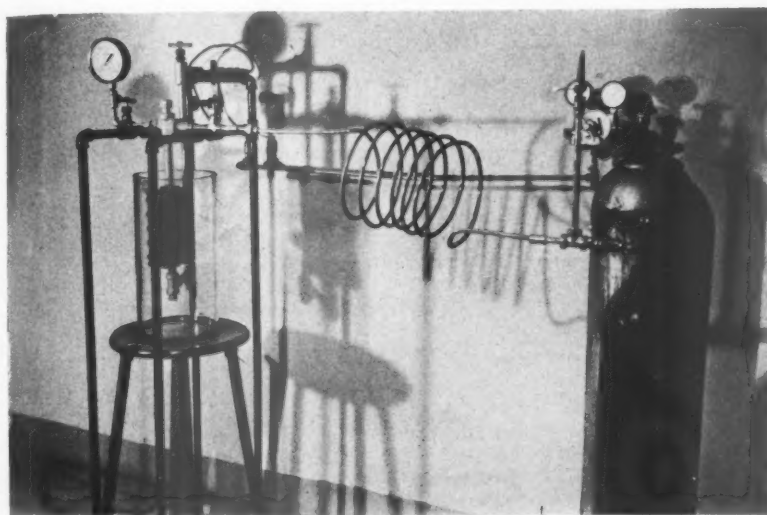


Fig. 4. Photograph of the apparatus used to study propane hydrate

propane and propane hydrate. Since there is no convenient way of measuring water vapor pressure under such conditions, no use has been made of it, though theoretically it could be used for determining  $n$ . The other limiting decomposition pressure is the minimum propane partial pressure, and this occurs when liquid water is present also. This is the equilibrium propane pressure which exists in a space containing liquid water and propane hydrate. Since the water vapor pressure is negligible by comparison with the equilibrium propane pressure, the total pressure is substantially equal to the propane pressure. The total pressure can be measured very readily, so that the decomposition pressure of propane hydrate usually means the total pressure when liquid water (saturated with propane but otherwise pure) and propane hydrate are present.

Figure 1 shows the decomposition pressure-

decomposition temperature relationship for propane hydrate in equilibrium with propane vapor and liquid water as determined in the IGT laboratory, pressure being in psia and temperature in deg. C. Results obtained by Deaton and Frost (1) are also shown; the agreement is satisfactory. The point for the highest temperature and pressure represents the critical decomposition conditions. It will be noted that this point is slightly above the dashed line which represents the vapor pressure of liquid propane according to the data in the Handbook Butane-Propane Gases (2). The critical decomposition pressure should of course be equal to the vapor pressure of liquid propane at the critical decomposition temperature; the discrepancy is not great.

If an aqueous solution be used instead of pure water, it is found that the decomposition pressure at any temperature is higher than when pure water is used. This effect is

predicted by Equation (3). The activity of the water in an aqueous solution is less than the activity of pure water at the same temperature. To keep the activity product constant when the activity of the water is decreased, the activity of the propane must be increased, and therefore the propane pressure must be increased.

Since the activity of the solid hydrate is the same whether it is in equilibrium with propane gas and pure liquid water or with propane gas and an aqueous solution, Equation (3) leads to

$$(f_2)(a)^n = (f_1)(a_1)^n = K \quad (4)$$

where  $(f_2)$  = fugacity of propane in equilibrium with propane hydrate and pure liquid water at temperature  $t$

$(f_1)$  = fugacity of propane in equilibrium with propane hydrate and an aqueous solution at temperature  $t$

$(a)$  = activity of pure liquid water at temperature  $t = 1$

$(a_1)$  = activity of water in the aqueous solution at temperature  $t$

$K$  = a constant.

From Equation (4) it follows that

$$n = \frac{\log(f_2/f_1)}{\log(a_1/a)} = \frac{\log f_2 - \log f_1}{-\log a_1} \quad (5)$$

where  $\log$  means logarithm to the base 10.

Then to determine  $n$  it is necessary merely to determine the decomposition pressure of propane hydrate in equilibrium with pure water, and the decomposition pressure of propane hydrate in equilibrium with an aqueous solution at the same temperature, provided the fugacity of propane is known or can be determined at the temperature and pressures concerned, and provided further that the activity of water in the aqueous solution is known or can be determined at the temperature concerned, the activity of pure water being unity. It should be noted that only the ratio of the fugacities is involved, so that the fugacities can be expressed in any units.

The fugacity of propane at various pressures and temperatures had been determined by Sage, Schaafsma and Lacey (4), but the lowest temperature they considered was 70 F., while the temperatures at which propane hydrate can exist in equilibrium with propane and liquid water are in the range 32-42 F. (0-5.7 C., as shown on Figure 1). It was therefore necessary to extrapolate the data of Sage, Schaafsma and Lacey into the desired range. For the details of this extrapolation the complete paper should be consulted; the results are shown by Figure 2.

The activity of water in many aqueous solutions has been reported in the literature, but since the activity is so sensitive to changes in concentration it would be necessary to know the concentration quite accurately if the literature values of activity were to be used. On the other hand, the activity can be calculated very readily from the freezing point depression by the thermodynamic relationship:



$$\log a_1 = -0.004211$$

$$\Delta t_f = 0.0000022 (\Delta t_f)^2 (6)$$

where  $a_1$  = activity of water in a solution at the freezing point of the solution

$\Delta t_f$  = freezing point depression of the solution, deg. C.

For dilute aqueous solutions of non-electrolytes the change in the activity of the water as the temperature is increased a few degrees is entirely negligible. For dilute solutions of electrolytes the change is small, and can be calculated if the relative partial molal heat content and relative partial molal heat capacity of the water are known, as they are for dilute solutions of many electrolytes.

The first solute tried was sucrose, but diffi-

culty in water at temperatures near 32 F. is high enough so that the solutions which were to be used were far from saturation. Two concentrations of each solute were used; these were chosen so as to get freezing point depressions in the range 1.5-4.0 Deg. C.

Figure 3 is a diagram, and Figure 4 a photograph, of the apparatus used in the experiments. The hydrate was formed and decomposed in a Jerguson gage having front and rear transparent glass windows. The Jerguson gage formed part of a U-tube, the rest of the U-tube being 1/2 inch iron pipe. The bottom of the U-tube was filled with mercury; the mercury level could be adjusted by propane pressure admitted to the top of the Jerguson gage or nitrogen pressure admitted to the top of the other leg of the U-tube.

The U-tube was surrounded by a glass jar which served as a thermostat. Figure 5 is a photograph of this portion of the apparatus. Since the temperatures to be employed were below room temperature, a mixture of crushed ice and water was placed in the jar, and an air lift was used to circulate the water in the jar so as to equalize the temperature.

At the beginning of an experiment the cap was removed from the top of the line coming up from the Jerguson gage and sufficient mercury was placed in the apparatus to bring its level into sight in the Jerguson gage. Then water or an aqueous solution was dropped into the Jerguson gage on top of the mercury, a thermometer was placed in the Jerguson gage and fastened so that it could be read through the front window, and the cap screwed into place. Crushed ice and water were placed in the jar, and the air lift started. A second thermometer was suspended in the bath close to the Jerguson gage. When the temperature within the Jerguson gage dropped to a few tenths of a degree above the freezing point, propane vapor was admitted to the top of the Jerguson gage, and the propane and nitrogen pressures adjusted to bring the top of the water or aqueous solution to the top of the thermometer bulb. Propane in the cylinder being liquid at room temperature, propane liquid soon formed in the Jerguson gage, and floated on the water or aqueous solution. After a small amount of liquid propane had formed, the admission of propane vapor was stopped, and the propane in the Jerguson gage was vented to waste, thereby removing any air or other gas from the vapor space in the Jerguson gage, and leaving only propane vapor. The process of condensing propane in the Jerguson gage, then venting it, was continued until a solid formed around the thermometer bulb; the temperature at this time was several degrees below the freezing point.

When the solid formation had occurred, the vent valve was closed, and the system allowed to stand, with water or aqueous solution floating on the mercury, a solid mass around the thermometer bulb, and a layer of liquid propane floating on the aqueous layer. The temperature within the Jerguson gage increased until it became equal to, or only slightly lower than, the temperature of the bath.

In the first experiments water was used, rather than an aqueous solution, and an excess of liquid propane was left in the Jerguson

gage. In these experiments the amount of solid decreased at first as the temperature increased, and then the amount of solid increased, the water and liquid propane decreasing in amount. By the time the temperature within the Jerguson gage reached 2 to 3 degrees Centigrade the liquid water was all gone, and the remaining liquid propane covered a solid mass of propane hydrate. The pressure was the vapor pressure of liquid propane at the existing temperature.

As the temperature increased, the pressure increased along the propane vapor pressure-temperature curve. When the temperature inside the Jerguson gage reached the critical decomposition temperature, the hydrate began to decompose at constant temperature and pressure. The bath temperature at first continued to increase, but was brought down by the addition of a small quantity of ice, and kept not more than half a degree Centigrade above the temperature within the Jerguson gage. The temperature within the Jerguson gage remained constant until all of the hydrate had decomposed, and the pressure also remained constant. After the hydrate had all decomposed, there was a layer of liquid propane on top of the layer of water; the temperature within the Jerguson gage then started to rise again.

#### Propane Allowed to Escape

After the critical decomposition pressure and temperature had been determined, the decomposition pressure-decomposition temperature relationship below the critical was determined. The procedure was the same as has been described above up to the point where all of the water had disappeared. Then, instead of letting the temperature and pressure increase together, the propane vent valve was opened slightly and the propane allowed to escape slowly at a pressure lower than the critical decomposition pressure. When all of the liquid propane had boiled off, the propane vent was closed, and the temperature inside the Jerguson gage then rose, the pressure remaining substantially constant. When the temperature reached the decomposition temperature for the pressure inside the Jerguson gage the hydrate started to decompose, and a liquid water layer formed. By cautiously venting the propane released through decomposition of the hydrate, the pressure could be maintained, and the temperature inside the Jerguson gage remained constant. The bath temperature continued to rise, but additions of small amounts of ice kept the bath temperature from getting more than half a degree Centigrade higher than the inside temperature, and if desired all of the hydrate could be allowed to decompose at constant temperature and pressure.

After several decomposition pressure-decomposition temperature points had been determined, these were plotted together with the results of Deaton and Frost (1), with absolute pressure plotted on a logarithmic scale against temperature in degrees Centigrade, yielding a straight line like that of Figure 1. This plot indicated that the decomposition pressure at the freezing point was about 24 psia. Accordingly, another series of experiments was carried out in which the procedure

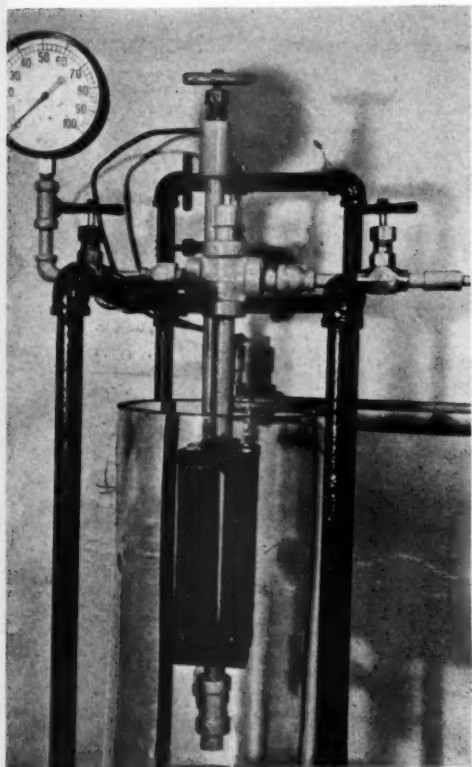


Fig. 5. Close-up of portion of apparatus used to study propane hydrate

culties were encountered which were attributed to crystallization of the sucrose. Therefore it was decided to use liquid solutes for subsequent experiments; acetone, methanol and ethanol were chosen because they could be obtained readily in pure form and do not corrode the metal and glass of which the equipment was made. Later potassium hydroxide was used; its cold dilute aqueous solutions are not corrosive, the relative partial molal heat content and relative partial molal heat capacity of water in them have been determined, and no crystallization of the solute was expected because the solubility of potassium hydroxide

was the same as described above except that the bath temperature was kept at the freezing point until all of the water had been converted to hydrate. Then the liquid propane was allowed to boil off, and when all the liquid was gone, propane vapor was vented until the pressure was 24.0 psia. Then the bath temperature was allowed to rise to 0.2-0.3 C. The temperature inside rose to 0.05 C., and remained constant as propane was vented off to keep the pressure at 24.0 psia. Similar experiments established the decomposition temperatures corresponding to decomposition pressures of 25.0 psia, 25.5 psia, 27.0 psia, and 27.5 psia.

It was not necessary to go through the entire procedure so far described to get each point on the decomposition pressure-decomposition temperature curve. After the hydrate had been decomposing at 27.0 psia for several minutes, the propane inlet valve could be opened for a short time, the pressure increased to about 32 psia, and the propane inlet valve closed again. As the temperature in the bath and in the Jerguson gage increased, the pressure decreased, showing that propane hydrate was forming. The pressure reached a minimum value and then started to rise again. Then the propane vent valve was opened, reducing the pressure to the minimum again, and the pressure kept at this value for several minutes while the hydrate was decomposing. If all of the hydrate had not disappeared, another addition of propane would then cause hydrate growth at a higher temperature and pressure, and this sequence could be followed until the critical decomposition temperature was reached.

The results of these experiments are shown graphically in Figure 1.

The fugacity of the propane in equilibrium

with propane hydrate and pure liquid water at each observed decomposition temperature was obtained by multiplying the observed decomposition pressure by the appropriate value of  $f/P$ , which was obtained from Figure 2. The results may be summarized by an equation:

$$\log f_2 = 26.253 - 6.7992(10^3/T) \quad (7)$$

By means of Equation (7) the value of  $\log f_2$  can be obtained for any temperature at which propane hydrate can exist in equilibrium with propane and liquid water.

In the experiments made with the solutes mentioned above the procedure was much like that used with pure water. Each solute was used to make two solutions. The more concentrated solution was approximately 2 molal and the more dilute solution approximately one molal in each case except that the more concentrated potassium hydroxide solution was approximately one molal and the more dilute potassium hydroxide solution was approximately half molal. Each solution was prepared just before use, and its freezing point depression determined in a modified Beckman apparatus, using the same thermometer which was to be used in determining the hydrate decomposition points. After the freezing point depression had been determined, the solution was placed in the Jerguson gage on top of the mercury, as described above. The hydrate formation was more difficult with some solutions than with others, but eventually hydrate was formed in every case, although in some instances repeated rapid evaporations of liquid propane were necessary to get a solid which would continue to grow after the temperature

within the bath exceeded the freezing point of water.

After a large mass of hydrate had been formed with the bath temperature slightly above the freezing point of water, propane was removed as before until the pressure dropped to the value which had been chosen for the experiment. Then the temperature was allowed to rise. In contrast to what had been observed in the experiments with pure water, with the solution present the hydrate started to decompose immediately, and the temperature within the gage rose steadily even though the pressure was maintained constant by venting propane. When a relatively small amount of hydrate was left the temperature became substantially constant, and the remaining crystals decomposed at constant pressure and temperature. In these experiments it was necessary to agitate the solution to keep its concentration uniform throughout; this could be accomplished by moving the mercury level up and down or by shaking the U-tube, the coil of  $1/8$ -inch pipe providing the necessary flexibility. By keeping the bath temperature not more than two to three-tenths of a degree Centigrade above the temperature inside the Jerguson gage it was possible to determine the decomposition temperature to one-twentieth of a degree Centigrade.

If the propane inlet valve were opened and more propane added before the last crystals had disappeared, it was usually possible to get the hydrate to grow again at a higher pressure. This made it possible to determine several points in one run. However, at the

(Continued on page 92)

## Who's Calling?

By E. WESLEY HENVER

● I recently had a unique experience. I phoned a friend of mine, and his telephone operator did not ask my name. She promptly put my friend's secretary on. And the secretary also failed to ask my name, my company, the business I had with her boss, when I was born, and was I a citizen. She just gave me the guy.

When I had recovered from this extraordinary proceeding, I asked him, "How come?" He said they do it that way, and that all their telephone operators and secretaries are instructed to pass on every call without interrogation.

Seems that one day their top man was subjected to the usual irritating catechism that is the order of the day on nearly every company telephone, and he blew his top. Now his company no longer subjects others to annoying heckling and time-consuming questioning.

We have come a long way in business courtesy. Not for nothing have public relations men been on the job. Some letters still may be "dictated but not read," but their

authors no longer insult us by saying so. Fewer letters are signed by secretaries with their coy little initials under the counterfeited signature. Collection letters have exchanged brusqueness for friendliness. In many waiting rooms, salesmen are furnished with trade publications and other literature to read, and the more enlightened concerns supply them with an analysis of the business they are calling on, the names of executives and buyers and their functions.

Business has grown up to man's stature. The very top men never did cower behind the skirts of their secretaries or bury themselves away from phone calls. They were always accessible to anyone, but the little shots too often had to be wooed and won to spare a moment of their precious time.

In the new spirit that prevades business there still remains, however, one last link to the discourteous past, and it's "Who's calling?"

Why, in all fairness to the two parties concerned in a business telephone conversation, should the caller be subjected to the necessity of furnishing an autobiography in order to be able to talk to the other man? There are not many really inconsequential calls, and the few that are can be easily terminated. In exchange for a small percentage of such calls, the man who will talk to anyone without first having a blueprint builds

friendliness for his company and himself.

Seems strange—doesn't it?—that businesses spend thousands of dollars to develop a friendly personality through advertising, and then cancel its effectiveness in part by up-stage telephone manners. Ever have the experience of being told by some secretary calling you for her boss to "hold the line" while His Majesty takes his time to pick up his phone, and you fiddle? That custom also should be scrapped.

For myself, I have found ways to combat these twin evils. When they ask me, "Who's calling?" I say, "Napoleon Bonaparte." That stymies the lassies so they put me on. Sometimes they tell their boss, and I tell him about my pet peeve. If the guy is regular, he agrees it is a hell of a custom.

On calling a man at his request, when he doesn't come on, I go off. He then calls up and apologizes, as, indeed, he should. If he wasn't ready to talk, he shouldn't have phoned. And he should drop whatever he is doing when I come on, and talk with me.

It is said that the best reformer is the one who begins on himself.

Holy mackerel, now it just strikes me that maybe our own operators ask, "Who's calling?" And they do. Let's all cut it out.—

Reprinted from *Printer's Ink* of June 1, 1945.



Speakers' table at the regional planning meeting held in Cincinnati, Ohio on December 3. Left to right are shown: R. C. Caylor, Surface Combustion Corp.; Walter C. Beckjord, president, Cincinnati Gas & Electric Co.; A. C. Moorhous, vice-president, Cincinnati Gas & Electric Co.; Chairman R. J. Paulsen, Cincinnati Gas & Electric Co.; F. W. Williams, American Gas Association; E. A. Weaver, Surface Combustion Corp.; J. I. Gorton, Gas Appliance Manufacturers' Association; and H. P. Morehouse, Public Service Electric & Gas Co., Newark, N. J.



Partial view of the luncheon gathering during the meeting held in Cleveland, Ohio on December 10. Last year's president of the American Gas Association, J. French Robinson, president, The East Ohio Gas Co., presided at this meeting.



UNDER the above title, the January MONTHLY reported on the series of regional planning meetings sponsored by the A. G. A. Residential Gas Section to promote an all-gas merchandising program. On these pages are shown photographs of the final stages of the tour which reached a highly successful conclusion in Rochester, N. Y. on December 17, after presentations in 31 cities throughout the country.



The regional planning meeting at Pittsburgh, Pa. on December 12 brought out this large crowd. It was held at the William Penn Hotel and was one of the most enthusiastic conferences of the tour. Christy Payne, Jr., sales manager, Peoples Natural Gas Co., acted as chairman.





Headliners at the Buffalo meeting on December 14 are pictured here. Standing, left to right: R. E. Williams, E. O. Olsen, J. I. Gorton, F. W. Williams and W. J. Grover. Sitting: Earl C. Desmond, S. B. Severson, George Scofield and H. P. Morehouse



Mrs. Luella Fisher, home service director, Iroquois Gas Corp., Buffalo, and home service girls in that area were photographed at the American Gas Association's meeting on December 14. They expect to play a prominent part in the all-gas merchandising program



View of the large gathering which attended the meeting at Rochester on December 17. This final meeting in the Residential Gas tour was held at the Seneca Hotel and R. E. Ginna, vice-president, Rochester Gas and Electric Corp., was chairman



Pictured at the Philadelphia meeting are: H. Preston Morehouse, R. Bell, Austin Monty, N. B. Phillips, Frank Trembly, Frank McFerran, E. O. Olsen, R. E. Williams, J. I. Gorton. Mr. Monty and Mr. Trembly were co-chairmen of this meeting



The regional planning meeting at Buffalo turned out this attentive audience. It was the next-to-last meeting in the tour and was directed by Earl C. Desmond, sales manager, Iroquois Gas Corp., and S. B. Severson, vice-president, Republic Light Heat and Power Company

# Atomic Research Benefits

Technological knowledge obtained in development of the atomic bomb holds promise of many advances within decade

BY J. D. TOMPKINS

RESEARCH and technological knowledge obtained in development of the atomic bomb, as applied to industry within the present decade, will many times repay the huge war-time investment through improved products, according to M. W. Kellogg Co., whose scientists and engineers were among leaders in designing and constructing plants, processes and equipment for the separation of U-235 from natural uranium.

New coolants, piping, heat exchangers, lubricants, pumps, packing, seals, valves and instruments by means of which several thousands new and improved products and procedures are now available to American industry, awaiting only government release, the company emphasizes.

Listing immediate and near-by benefits to industry, the Kellogg study estimates that corrosion data obtained in gas diffusion processes will save American industry many millions of dollars annually in critical equipment.

More than 250,000 hours of research were devoted to pumps in connection with the atomic projects. It is estimated that the accrued benefit to private industry from this single item will, within twenty years, more than equal the nation's total investment in the war project.

Development of diffusion techniques, valuable to petroleum, chemical and other industries connected with atomic research, had been impossible previously for the reason that no single industry or

group of industries could expend the prohibitive time and money in the necessary research.

Commenting on the completion of a large part of basic research on diffusion barriers and their application to full-scale industrial operations, the Kellogg firm says, "It seems almost certain that helium will be separated from natural gas by diffusion techniques rather than by the present refrigeration method. It may be easier to isolate hydrogen by these new methods from a number of process gases because the diffusion velocity of hydrogen, the lightest of our elements, is over four times that of any compound associated with it.

"The separation of oxygen or nitrogen and rare gases in air without resorting to liquefaction and fractional distillation, is another possible application.

"The direct isolation of natural gasoline fractions from crude petroleum without resorting to distillation, and new types of fractioning columns for the petroleum refining industry, also appear feasible."

Control of the continuous gas recycling operation of the atomic projects required instrumentation on a hitherto undreamed of scale. The instrument industry had to provide new and improved apparatus of unprecedented sensitivity and accuracy for continuous analyses of

process gases, both quantitative and qualitative. To meet this need, there were developed the most precise, continuous, automatic and analytical control instruments ever conceived. This refinement, one of the outstanding features of the uranium gas diffusion processes, the Kellogg firm emphasizes, is of utmost importance to present-day industry.

Instruments which before had only existed in experimental form in research laboratories, or were non-existent, were invented, improved upon and adapted to commercial uses. The result has been the creation of a more nearly perfect robot control system for industry than has ever before existed.

An outstanding example was the new and improved mass spectroscopy which petroleum refiners will use for continuous control of cracking operations and transfer line analyses.

Meantime, it is suggested, processing industries are not the only beneficiaries from atomic research. Knowledge gained from end or intermediate products of the wartime project are expected to make available for therapeutic medicine a more abundant and cheaper source of radioactive materials of almost incalculable value to experimental medicine and eventually to practical medicine.

## A. G. A. Rate Service

One of the most useful and valuable activities of the American Gas Association is the preparation of a comprehensive rate service. This service is invaluable in that it is the only one of its kind showing in detailed form gas rate schedules in actual use.

Issued in loose-leaf form, the rate service contains over 500 pages (8 1/2" x 11") of complete and accurate information relative to gas rate schedules. It is leatherette bound and is kept up-to-date by monthly supplements.

Gas rates for hundreds of companies over the entire United States and Canada are reported in such detailed and excellent form that they should be of great assistance to rate-making departments in the shaping of new rates and industrial and commercial departments in evaluating sales comparisons with other companies.

In addition to all types of gas rate schedules, the service includes lists of communities supplied with gas, the companies supplying these communities and the heating value and type of gas served. Companies subscribing to this service have found it to be indispensable. Considering the value, the cost is nominal.

Subscriptions to members (including supplements): \$12.00 per year  
To non-members: \$15.00 per year

Reprinted from New York Herald Tribune.

## Conference on Domestic Gas Research To Be Held in February



F. M. Banks

ally for engineers and other technical personnel of gas companies and appliance manufacturing companies.

There will be technical and semi-technical illustrated papers on the various research projects of the Committee on Domestic Gas Research, and other activities in the general field of domestic gas research. At the general sessions papers will be presented by representatives of the A. G. A. Testing Laboratories which will cover the technical highlights of research work done recently. These presentations will include research work done in the fields of Cooking, Burners and Pilots, Water Heating, and House Heating.

In addition to these papers, a representative of the Case School of Applied Science will present a paper on "An Analysis of the Corrosion Problem in Gas Water Heaters." A paper will be presented on "Corrosion in Gas Furnaces and Boilers—The Problem and Approaches to its Solution." This problem has been assigned to Battelle Memorial Institute.

### Movie on Condensation in Home

A special feature of the conference will be a motion picture on humidity conditions and condensation in homes which will be presented by the Housing Research Division of Purdue Research Foundation. Another presentation by a Purdue representative will be a paper on "Research Problems in Venting Gas Heaters."

Luncheons during the two-day conference will be addressed by E. J. Boothby, president, American Gas Association, and Lyle C. Harvey, president, Gas Appliance Manufacturers Association.

It is planned to devote the afternoons to individual panel sessions embracing the activities of the several technical advisory groups of the Committee on Domestic Gas Research. They will be conducted by the respective chairmen of each group:

Technical Advisory Group for Domestic Gas Cooking Research, Charles M. Mayer, Acting Chairman, The Tappan Stove Co.  
Technical Advisory Group for Domestic Gas Water Heating Research, L. R. Mendelson, Chairman, The Hotstream Heater Co.  
Technical Advisory Group for Central Gas

Space Heating Research, Keith T. Davis, Chairman, Bryant Heater Company.

Technical Advisory Group for Direct Gas Space Heating, E. C. Adams, Chairman, Adams Bros. Mfg. Co.

Technical Advisory Group for Burners, Controls and Accessories Research, Dr. William R. Hainsworth, Chairman, Servel Inc.

Reports on new phases of research projects that have not been reported on previously will be made available to those attending the conference.

Due to the present hotel situation, those planning to attend the conference are advised to make requests for hotel reservations direct, stating that they will be attending the A. G. A. Conference.

### A. G. A. Midwest Personnel Conference Meets

THE eighth meeting of the American Gas Association Personnel Conference was held at the Hotel Fontenelle, Omaha, Nebraska, on January 8. C. C. Jolley, personnel director, Natural Gas Pipeline Co. of America, presided. The Conference was well attended by executives in charge of industrial relations of the gas companies of that area.

In opening the meeting Chairman Jolley reviewed the activities of the group since its formation in October 1944, reported on general trends in personnel management and outlined the problems ahead. A message from Kurwin R. Boyes, secretary, American Gas Association, was read by H. F. Voertman. Mr. Boyes reported on the activities of other A. G. A. personnel groups.

The handling of returned veterans was the first subject discussed. All companies represented reported that about 90 per cent of their employees in the armed services had returned and most of them had been placed in better jobs.

Problems in connection with the return of the normal work-week, and the employee benefit policies of the various companies were also reported and discussed as were trends in contract negotiations.

The conference decided to hold four additional meetings in 1946—in March, June, September, and November. The next meeting is to be held in March at the Phillips Hotel in Kansas City, the exact date to be announced. Gas company executives of Arkansas, Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, South Dakota, and Wyoming, concerned with industrial relations matters, are cordially invited. Further information may be secured from C. C. Jolley, personnel director, Natural Gas Pipeline Company of America, 20 North Wacker Drive, Chicago 6, Illinois.

## Committee Calendar

### FEBRUARY

- 4 •Program Committee, Accounting Section, American Gas Association Headquarters, New York, N. Y.—E. F. Embree, Chairman
- 5 •Promotional Committee, American Gas Association Headquarters, New York, N. Y.—D. A. Hulcy, Chairman
- 5-6 •Committee on Accounting Procedures and Practices, Accounting Section, Edison Electric Institute Headquarters, New York, N. Y.
- 5-6 •Committee on Natural Gas Reserves, Houston, Texas—N. C. McGowen, Chairman
- 6 •Committee on Research and Promotional Plan, A. G. A. Headquarters, New York, N. Y.—E. R. Acker, Chairman
- 6 •American Gas Association Executive Board, Headquarters, New York, N. Y.—Everett J. Boothby, Chairman
- 7 •Gas Production Research Committee, American Gas Association Headquarters, New York, N. Y.—P. T. Dashiell, Chairman
- 8 •Subcommittee on Use of Oxygen in Gas Manufacture, Technical Section, American Gas Association Headquarters, New York, N. Y.—L. L. Newman, Chairman
- 18 •Subcommittee on Carbonization and Coke—Gas Production Committee, Technical Section, American Gas Association Headquarters, New York, N. Y.—C. C. Russell, Chairman
- 19 •Subcommittee on Water Gas, Gas Production Committee, Technical Section, A. G. A. Headquarters, New York, N. Y.—J. Hawley Taussig, Chairman
- 20 •Joint Program Committee, Gas Production and Chemical Committees, Technical Section, A. G. A. Headquarters, New York, N. Y.—C. W. Wilson, Chairman, Chemical Committee; R. Van Vliet, Chairman, Gas Production Committee

### APRIL

- 3 •American Gas Association Executive Board, Headquarters, New York, N. Y.—Everett J. Boothby, Chairman

## New Research Technical Advisory Group Formed



Dr. Hainsworth

F. M. BANKS, chairman, A.G.A. Committee on Domestic Gas Research, has announced the recent formation of the Technical Advisory Group for Burners, Controls and Accessories Research under the chairmanship of Dr. William R. Hainsworth, vice-president in charge of engineering, Servel Inc. Members of this new group which held its first meeting in December are: Philip S. Harper, Harper-Wyman Company, Chicago; B. A. Johnson, Minneapolis-Honeywell Regulator Co., Minneapolis; Dean Olds, The Coleman Lamp & Stove Co., Wichita, Kan.; Paul Sagar, General Controls Company, Cleveland; Lyman M. Van der Pyl, Pittsburgh Equitable Meter Company, Pittsburgh; and C. C. Winterstein, The Philadelphia Gas Works Company.

Active projects over which this group has assumed supervision are:

- Project DGR-1-B Research in development of 100% primary air atmospheric injection gas burners.
- Project DGR-2-B Research in the effect of ambient temperatures and pressures on primary air injection, flame, and other gas burner operating characteristics.
- Project DGR-3-B Research in design methods of preventing closure of gas pilot burner primary air openings by dust and lint.
- Project DGR-4-B Investigation of extent of

gas flame impingement allowable for satisfactory combustion.

Project DGR-5-B Research in pilot design, construction and performance.

Project DGR-6-B Research in fundamentals of noise of extinction of large gas burners.

It was further stated by Mr. Banks that new members have been appointed to several other of the technical advisory groups of the Committee on Domestic Gas Research for the

## Home Study Course on Natural Gas

FOR some years the University of Kansas at Lawrence, Kansas, has been conducting a Home Study Course on Natural Gas. This course is primarily for persons engaged in the industry who wish to extend their knowledge while still actively employed. It is especially helpful to the younger men whose opportunities for experience have been limited, but it covers the fundamentals of the various phases of the industry to such an extent that it has proved valuable to seasoned executives. Its subject matter covers the whole field of natural gas operations, from origin to utilization.

This course was proposed by the American Gas Association about fourteen or fifteen years ago, and the University of Kansas was asked to prepare a text and to conduct it through the extension division. The text was published in 1934 and the course has been in continuous operation since that time under the personal supervision of Professor C. M. Young. The material of the text was reviewed and criticised by an Advisory Committee of the A. G. A., composed of eminent specialists of different phases of the gas industry. Supplements are prepared from time to time to keep it up to date. These supplements are sent to all students who have completed the work as well as those currently engaged in it.

The course covers the entire industry except company organization, financing and rates; in other words, it deals with the physical aspects of the industry. It consists of twenty-seven assignments, some of which have two, and in one case three, sections. Each assignment or section is followed by questions which are to be answered by the students. Students are permitted to submit lesson reports as rapidly as they wish, and each is encouraged to continue the work regularly and systematically.

Experience has shown that the course may be completed in five months, but the large majority of students require the greater part of two years.

The cost to individual members and to employees of member companies of the American Gas Association, as well as to all residents of the state of Kansas is \$54.00. For all others, the fee is \$72.00, payable in advance; or \$74.50 on a time payment plan.

1946 Association year. They are: Technical Advisory Group for Central Gas Space Heating Research, Thomson King, Consolidated Gas, Electric Light & Power Co. of Baltimore; Carl Lawrence, Atlanta Gas Light Co.; Dr. F. E. Vandaveer, The East Ohio Gas Co., Cleveland; Technical Advisory Group for Domestic Gas Cooking Research—Charles M. Mayer, The Tappan Stove Co., Mansfield, Ohio; Technical Advisory Group for Direct Gas Space Heating Research—W. G. Cartter, Day and Night Mfg. Co., Monrovia, Calif.; J. R. Scherrer, Security Mfg. Co., Kansas City, Mo.; and W. A. Stuckey, Peerless Mfg. Co., Joliet, Ill.

Enrollments are accepted at any time. Application blanks and any further information desired will be furnished by either the University Extension Division, University of Kansas, Lawrence, Kansas, or Kurwin R. Boyes, Secretary, American Gas Association, 420 Lexington Avenue, New York 17, N. Y.

## Pacific Coast Utility Institutional Campaign

A PROGRESSIVE institutional advertising program is being conducted by the Pacific Gas and Electric Company of San Francisco, under the direction of Robert R. Gros, advertising manager. General purpose of the program is two-fold: to help the advancement of Northern California and to develop additional company business. There are six national advertisements in the series, the first three of which will carry the campaign well into 1946. Media through which these advertisements will reach the public are: *Time*, *Saturday Evening Post*, *Wall Street Journal*, *Newsweek*, *Forbes* and *United States News*.

The advertisements are illustrated with four-color paintings in dominant size. Each scene was painted by a top-notch western artist with on-the-spot authenticity. Among the topics in the first part of the series were: foreign trade and markets, illustrated by a shipping scene; permanence of west's industrial growth, accompanied by a night scene at a great oil refining plant; transportation hub of the west, suggested by artist's map of 11 states; cheap power builds markets, depicted by an oil painting of Lake Spaulding dam.

To supplement the advertisements, the P. G. and E. offers complete assistance—free—to anyone planning to open a business in Northern California or even considering such a move. The company has built up a staff of well trained engineers to help industrial firms learn all the facts about locating in the region.

Advertising Manager Gros is a winner of the Socrates annual award as a result of his outstanding work on some of the utility's past advertising campaigns.

## Salesability

● From a poll taken among the members of the Chicago Sales Executives' club were tabulated twenty qualifications of a postwar salesman. The top five traits were:

1. *Dependability.* Not only in carrying out directions, but also in meeting emergency situations not covered by company instructions.
2. *Integrity.* That keeps a salesman true to his company and customers.
3. *Knowledge of Products.* One of the three fundamental knowledges required in successful selling.
4. *Self-Management.* Essential in salesmen because they enjoy a greater degree of freedom than do any other group of employees.
5. *Work Organization.* Efficiency in self-management that probably contributes as much to sales leadership as does any other trait.

—Jobber Topics



## "Forum" Launches Program to Expand Home Modernization Credit

EXTENDING its program to finance household equipment, such as ranges, refrigerators, etc., by including it in new home mortgages, *The Architectural Forum* has launched a movement to popularize a plan for additional advances under the original mortgage to cover modernization and repairs. Following a survey, which indicated that in nearly every state it is possible to draw up a mortgage to cover additional credit to the home owner for repairs and modernization, the Forum will shortly issue a pamphlet similar to its earlier "Selling the Second Half-Million," for distribution to the nation's lending institutions. Purpose of the pamphlet is to promote greater acceptance of this method of expanding consumer purchasing power for home modernization.

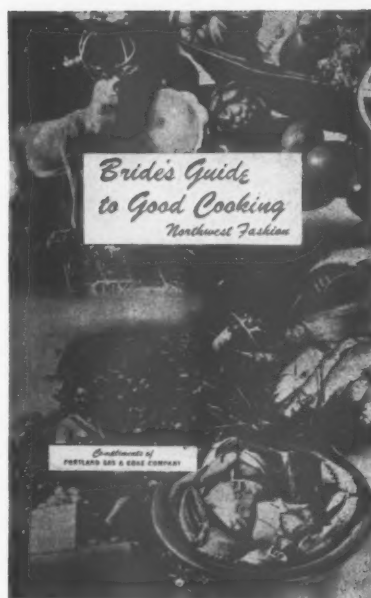
It is pointed out that for the borrower, additional advances mean substantially easier credit terms. For example, suppose John Doe needs \$500 to put on a new roof or make other long-delayed repairs. If he borrows at the usual terms (a three-year loan at a 5 per cent discount rate) he will pay \$3.19 in interest per \$100 per month. But if he can get an additional advance under his mortgage at 5 per cent, the extra credit, spread over 10 years, will cost only \$1.06 per \$100 per month.

For the mortgage lender, additional advances mean that the properties in which he has a stake will be well-maintained throughout the life of the mortgage. They offer an opportunity to put more money to work with borrowers whose credit is already well established.

Main disadvantage of using realty mortgage credit for modernization is that in some states it requires re-writing the mortgage, re-appraisal and a re-search of title. But, the Forum has found, progressive lending policy is swinging more and more in the direction of a simple agreement in incorporating the advance in the mortgage, which makes unnecessary a long, costly title search, and other charges.

The additional advance plan received a big push ahead from a recent amendment of the G.I. Bill of Rights. The amendment approves an additional realty loan up to \$500 for repairs or improvements without the necessity of a title search, permits an affidavit instead.

The pamphlet outlining the Forum's plan for stretching the home owner's modernization dollar may be obtained soon from The Architectural Forum, 350 Fifth Avenue, New York 1, N. Y.



Cover design of popular bride's booklet

## Bride's Booklet Proves Popular

A BOOKLET very popular with brides in Portland, Oregon is a "Bride's Guide to Good Cooking" made available to them with the compliments of the Portland Gas & Coke Company.

It is designed to use as a gift to brides through the "Welcome Wagon Service" of Portland. The front and back cover-spread pictures many foods native to the Northwest. Recipes for Columbia River smelt, razor clams, dungeness crabs, chinook salmon, wild blackberry jelly and many other equally delectable dishes are given.

The booklet, prepared by the Home Service Department, Rita Calhoun, director, is well illustrated and gets off to a good start with the story of gas and at least 15 characteristics why it is superior as a cooking fuel.

## Panhandle Eastern Gets New Gas Supply

SHAMROCK Oil and Gas Corporation, Amarillo, Texas, have transferred 57,000 acres of Texas Panhandle gas leases to the Panhandle Eastern Pipeline Co., according to officials of the Shamrock company. Both sweet gas and sour gas, the sour gas after desulphurization, will be delivered to a Panhandle Eastern Line Terminal, starting June 1, with 30 million feet daily. By terms of the contract, this amount is to be increased within 10 years to 60 million feet daily. While the price per thousand cubic feet was not announced, it was said to be in line with other pipeline gas prices in the Panhandle field. These prices range from 3½ to 5 cents.

## Our Frontspiece

THE striking action picture of a gas well shown in the MONTHLY frontspiece was taken on July 24, 1945, within a few seconds after the well had been shot with 90 quarts of nitroglycerine. The well was drilled by the Ohio Oil Company on the D. B. McCune farm approximately four miles north of the city of Salem in Mahoning County, Ohio.

Decision to shoot the well was made after drilling through the Oriskany sand where gas had been discovered from 3609 to 3630 feet. The sand was found to be hard and less productive than expected. The shot increased the open-flow production from 165,000 to 2,974,000 cubic feet one hour later.

Gas from the well is being purchased by the Natural Gas Company of West Virginia, which is an associate of The Manufacturers Light and Heat Company in the Pittsburgh group of companies of the Columbia Gas and Electric Corp. The picture is published through the courtesy of Charles E. Bennett, president of The Manufacturers Light and Heat Company.

## Home Service Career Booklet Issued

A NEW folder entitled "Home Service, Road to Opportunity" has been prepared by the Home Service Committee of the American Gas Association for distribution by gas companies. Its purpose is to direct attention of teachers and students of home economics toward the importance of home service work as a job and as a career, thus helping to meet the existing shortage of qualified home service people.

Members of the committee believe that this small folder can be distributed by gas companies to college students in their areas for vocational meetings and to high school home economics clubs. It was thought that many members of women's clubs would be interested to direct the attention of their daughters toward such work as a career.

For the companies who are not interested in urging further enrollments of home service, this serves as a good consumer piece for local people to know just what the gas company home service department can do.

The folder was prepared by a subcommittee including Hulda Ungericht Wells, Ohio Fuel Gas Co., chairman, Mary Belle Burnett, Cincinnati Gas & Electric Co., and Mildred Clark, Oklahoma Natural Gas Company. James E. Humphreys, business promotion manager, Ohio Fuel Gas Co., planned its format and design.

Copies sell for four cents each.

## Southwest Personnel Executives Meet

THE American Gas Association Southwest Personnel Conference held its eleventh meeting in New Orleans on January 11. H. D. Carmouche, general superintendent, Houston Pipe Line Co., chairman, presided and arrangements were directed by W. H. Senyard, director of personnel, Louisiana Power & Light Co.

Kurwin R. Boyes, secretary, American Gas Association, opened the meeting with observations on the general labor situation. Considerable time was devoted to discussion of problems arising out of a return to a normal week and to contract negotiations. No particular difficulty in satisfactorily placing employees returned from the armed forces was reported. Other topics reviewed were employee retirement and thrift plans, supervisory training plans, and pre-employment testing for job assignment.

The Conference unanimously elected V. H. Luneborg, personnel manager, Arkansas Natural Gas Corp., secretary. A committee consisting of E. A. Werner and V. H. Luneborg was appointed to draft a resolution expressing appreciation to M. V. Cousins, personnel director, United Gas Pipe Line Co., for his leadership as the former chairman of the conference.

## P. C. G. A. Proceedings

PROCEEDINGS of the Pacific Coast Gas Association for 1945, Volume 36, are now available in printed form. Containing 138 pages of valuable material, this book includes many reports and papers presented before meetings of the Accounting, Manufacturers', Sales and Advertising, and Technical Sections. The bulk of its pages, approximately half, are devoted to comprehensive technical reports. Copies are available at P. C. G. A. headquarters, 447 Sutter St., San Francisco.

## America Needs 12 Million Gas Ranges

WHILE the normal replacement rate of the 20,900,000 gas ranges in use in the United States and Canada is approximately 10 per cent, nearly 60 per cent of the gas industry's customers, or 12,540,000 homes, have ranges without the latest automatic controls and other modern features, according to Lyle C. Harvey, president, Gas Appliance Manufacturers Association, and member A. G. A. National Advertising Committee.

"This large replacement market plus the emphasis on fully automatic gas appliances creates the greatest profits opportunity in major appliances history," Mr. Harvey declared. "The new ranges built to 'CP' requirements will have every single feature women are asking for and gas range promotion will be centered around clock-controlled equipment which the gas industry first introduced in the early 1930's."

Mr. Harvey stated that other new gas appliances being developed include a gas clothes dryer, which will become a companion piece to home laundry equipment already developed; a new steam cooker which will operate on an entirely new principle, and will be available either as an integral part of the range, or as a separate unit.

## Natural Gas Industry In the Spotlight

A PICTORIAL and factual presentation of unusual scope and excellence giving the present status and prospects of the natural gas industry is an outstanding feature of the December, 1945, issue of *The Lamp*, company publication of the Standard Oil Company of New Jersey. In addition to up-to-date information on natural gas production, distribution, chemical prospects, etc., the article includes a large map showing the network of pipe lines covering the country. A striking chart plots the growth of gas production in the nine leading states.

## Monthly Range Output of 256,000 Planned

PRODUCTION of gas ranges is planned to reach 256,000 a month by the end of this year, A. B. Ritzenhaler announced January 9 at a meeting of the National Retail Furniture Association. In 1941 there were 183,000 gas ranges produced per month, he said.

Three main impediments to increased production of stoves, cited by Mr. Ritzenhaler, are shortage of material for thermostats, lack of labor, and the tight situation in lumber.

## Preparing Questionnaires

By H. G. WEAVER

Condensed from The A.B.W.A. Bulletin

● Never try to appraise the results of a direct mail survey without first studying the questionnaire—with special reference to such points as the following:

1. Was the questionnaire skillfully developed?
2. Were the questions easy to understand—with a minimum chance of being misunderstood?
3. Are the questions properly arranged? Consider not only the construction and arrangement of each individual question, but:
  4. Is the sequence or continuity such as to avoid confusion and facilitate the respondent's "flow of thought?"
  5. Are questions on similar items asked the same way?

This is especially important as regards

## Review of Fatal Injuries Available

FOR those interested in safety activities, the "Review of Fatal Injuries in the Gas Industry During 1944" has been prepared by the Accident Prevention Committee, and is available upon request to the American Gas Association. The report has been published in an effort to distribute information which will contribute toward the development of safe practices as an integral part of the operating program of the gas utility industry.

The bulletin describes twenty-one fatal accidents which occurred within the gas industry during the year 1944. In each case, the department, occupation of employee, description of accident, comments, and prevention suggestions are given.

## Brooklyn Union Has Record Year

FOR the fourth year in a row and the ninth time in the past decade, The Brooklyn Union Gas Company's sendout has shown a substantial gain over the previous year's. The new record, highest in Brooklyn Union's history, is 29,605,565,000 cubic feet. It is 1,103,626,000 cubic feet, or 3.87% above the previous peak established in 1944.

Compared to 1935, last year's sendout was up 8,198,773,000 cubic feet or 38%. The year was notable in a number of other respects. It produced the biggest sendout for a single day in the company's history—152,840,000 cubic feet—and the greatest number of 100,000,000 cubic foot days—there were 67 of them, compared to 39 the previous year.

any series of items where the answers are to be compared on a relative basis.

6. Do the questions cover the subject adequately?

7. Do they afford the opportunity for the respondent to give any kind of answer that may reflect his individual reaction?

8. Does the questionnaire provide for all the data that will be needed for an adequate statistical breakdown?

9. Does it invite the respondent to qualify his answers with remarks and comments?

This is extremely helpful in enabling the researcher to properly interpret the statistical findings.

10. Is the questionnaire short enough to insure high returns?

11. Is it attractive and inviting or does it look as though it were developed by a bureaucratic statistician?

12. Do you think that you yourself would have bothered to fill it out?

American Business Writing Association,  
Urbana, Illinois



## Recommend Inch Lines Be Retained for Oil

THE Surplus Property Administration, reporting to Congress on Jan. 4, recommended that top preference be given to keeping the Big Inch and Little Inch pipelines in petroleum. The agency also advised that if these two major lines—built during the war at a total cost of \$145,800—cannot be marketed for the movement of crude oil and petroleum products from the Southwest to the Atlantic seaboard, they should be disposed of for service to intermediate points. Private interests should be given preference in disposal of the lines, SPA stated.

Disposal for conversion to natural gas "will be favored only if it proves impossible to keep the lines in petroleum service and the national security is otherwise adequately protected."

At least two studies have been made on

conversion of the lines to gas. Both conclude that such use would be economically feasible and possible from an engineering standpoint. However, the SPA concludes, "since the lines were not designed for gas, their value for this purpose would be much less than if they were used for the transportation of oil."

## Texas Gas Production Up

THE engineering department of the oil and gas division of the Texas Railroad Commission at Austin, has reported that the total sweet, sour and casinghead gas produced in Texas for 1945 was 2,648,069,745,000 cubic feet, approximately 213 billion cubic feet more than the previous year. Carbon black produced during 1945 amounted to 662,912,393 pounds, as compared with 483,278,376 pounds in 1944. Texas had 92,200,995 pounds of carbon black stored in 1945, against the 1944 storage figure of 54,558,974 pounds.

## Speedy and His Pals Send a Message

... and the holiday lasts all year... when these jolly Quints help with COOKING, REFRIGERATION, HOT WATER SERVICE, HEATING AND AIR-CONDITIONING.

I'll do your cooking faster—  
Bring hot water in a wink.  
At action, I'm a master;  
Even quicker than you think!  
—SPEEDY

I'll save you hours of scrubbing—  
Help you keep things new and bright.  
Say goodbye to endless rubbing.  
For, with gas, housework is light.  
—CLEAN

I take responsibility  
Without complaint or frown.  
I'll give you more tranquility.  
And never let you down.  
—STEADY

Just name the temperature needed:  
High, low or in between—  
Your slightest wish is heeded.  
I'm flexible, I mean.  
—FLEXY

And I'm for conservation!  
I'll save you cash and food—  
Keep nutrients in your ration.  
And do your budget good.  
—THRIFTY

For a happy New Year with many happy returns, equip your new or remodeled home with modern gas appliances.  
THE PACIFIC COAST GAS ASSOCIATION

THE WEST PREFERS  
**GAS**  
QUICK • CLEAN • DEPENDABLE  
FLEXIBLE • ECONOMICAL

Holiday greetings of The Flame Family carried a powerful message for the New Year. This series of the Pacific Coast Gas Association is one of the most popular ever sponsored by the gas industry

## Report on Economics of Gas House Heating

AN exhaustive analysis of "Factors Relating to Economics of Gas House Heating" by Hall M. Henry, director of gas operations, Negea Service Corp., Cambridge, Mass., has just been published as Report No. 5 of the A. G. A. Postwar Planning Committee, A. M. Beebe, chairman.

While the main part of the report was published in four installments in the A. G. A. MONTHLY last spring and summer, there have been many revisions and changes, and two valuable supplements have been added. It represents a valuable aid to both manufactured and natural gas companies seeking clarification of house heating economics.

Among the conclusions reached by the author are:

That large potential savings in investment costs to serve the heating load may be realized through proper choice of gas processes.

That the overall cost per M cu.ft. of gas for heating may be substantially reduced through proper selection of plants to serve certain base and peak blocks of the heating load.

Degree-day data can be used to evaluate the overall costs per M cu.ft. of producing gas by different gas manufacturing processes.

That there are now available a number of methods and processes for meeting the peaks of heating which will result in relatively low investment costs and reasonably satisfactory overall holder costs for gas used for heating purposes.

Mr. Henry is chairman of the Postwar Planning Subcommittee on Engineering and Economic Phases of the Gas Industry. His printed report may be obtained from the American Gas Association, 420 Lexington Ave., New York 17, N. Y., at a cost per copy of 50 cents to A. G. A. members and \$1.00 to non-members.

## Combat Hydrogen Sulfide Poisoning

METHODS used successfully in combating hazards of hydrogen sulfide poisoning in the Elk Basin oil field of Wyoming and Montana can be adapted to nearly every oil field in which gas with a high content of hydrogen sulfide is produced with the oil, the Bureau of Mines reported January 2 in a new publication which again calls attention to the dangers of hydrogen sulfide poisoning in the petroleum industry.

As a result of precautionary measures in disposing of hydrogen sulfide gas by companies operating in the Elk Basin oil field, not a single serious injury or a fatality from hydrogen sulfide poisoning has occurred in more than two years, the Bureau report pointed out.

A copy of the publication, Information Circular 7334, "Method of Handling Hydrogen Sulfide Gas in the Elk Basin Oil Field of Wyoming," by J. H. East, Jr., and Ralph H. Espach, may be obtained free from the Bureau of Mines, Department of the Interior, Washington 25, D. C.

## Structure and Stability of Burner Flames

IN reporting further studies of the structure and stability of burner flames, Guenther von Elbe and Morris Menster, in a paper presented at the recent meeting of the Division of Gas and Fuel Chemistry of the American Chemical Society, in New York, N. Y., showed that, contrary to Mache's model of the progressive extinction of a flame from the burner rim, a combustion zone cannot vanish within a combustible stream. The depth of penetration of the quenching of the explosive reaction by the burner wall was calculated from values of burning velocity and critical boundary velocity gradient for flash-back, and compared with the limiting distance between plane-parallel plates and the limiting tube diameter for flame propagation. The thermal expansion of the gas normal and parallel to the combustion zone was discussed. An experimental analysis and discussion of partial entrance of the combustion zone into the burner tube (tilted flame) and partial attachment to the burner rim was given.

New data have been obtained on hydrogen and acetylene flames.

For instantaneous flash-back, the boundary velocity gradients are independent of tube diameter, as expected; these gradients are not a satisfactory criterion for flame stability because flash-back can be readily induced by tilted flames. The limit of the tilted flame

range was represented by the following semi-theoretical equation:

$$g/\sqrt{1-4S_u/g^2} = \text{constant},$$

where  $g$  is the boundary velocity gradient,  $S_u$  the burning velocity, and  $R$  the tube diameter.

The boundary velocity gradients for blow-off were again found constant over the laminar flow range. The compression of acetylene-oxygen streams by the combustion zones was measured. The burning velocities calculated from these and additional thermodynamic data agree well with those determined from gas flow and cone surface.—*Industrial Heating*, August, 1945.

## Gas Exhibit at Home Builders' Show

AS industry participation in the National Home Builders' Show at the Stevens Hotel, Chicago, Feb. 25-28, is now assured with the completion of arrangements for a display featuring New Freedom Gas Kitchens sponsored by the American Gas Association. Open only to members of the home building industry, attendance at the show is expected to surpass all previous records.

Booth No. 175, located a short distance from the Servel display, will feature metal reproductions of all-gas kitchens appearing in recent national advertisements along with a scale model of a range-type house built for Surface Combustion Corp. by the Diorama Corp. of America. In addition, a corner display will direct attention to the soon-to-be-published Reference Manual of Modern Gas Service, with architects and builders being given an opportunity to request copies through their local gas companies.

On a well-lighted modern background will be shown a number of colorful New Freedom Gas Kitchens and a directory of gas appliance exhibitors will tie up the gas exhibit with other participating members.

Several companies including the Rochester Gas and Electric Corp., Minneapolis Gas Light Co., The Ohio Fuel Gas Co., and Boston Consolidated Gas Co., are furnishing their home planning consultants to explain the New Freedom Gas Kitchen program and to answer inquiries.

## Oklahoma Utilities Association Elections

A. F. POTTER, The Gas Service Co., Bartlesville, Oklahoma, has been elected president of the Oklahoma Utilities Association for the year 1946. Other officers selected are: S. I. McElhoes, Bartlesville, first vice-president; L. A. Farmer, Ponca City, Oklahoma, second vice-president; E. C. Joulilian, Oklahoma City, treasurer. Kate A. Niblack, Oklahoma City, was re-elected secretary.

New directors were named as follows: (3 year term) Glenn C. Kiley, Oklahoma City; Frank B. Long, Tulsa; (1 year term) E. C. Joulilian; R. K. Lane, Tulsa; E. I. McElhoes; J. Y. Wheeler, Ardmore, Oklahoma; and W. L. Woodward, Alva, Oklahoma.

## Convention Calendar

### FEBRUARY

- 31 Feb. 1-2 •Home Service Work Shop, Hotel William Penn, Pittsburgh, Pa.
- 4-5 •National Association of Purchasing Agents, Public Utility Buyers' Group, Edgewater Hotel, Chicago, Ill.
- 4-6 •Home Service Work Shop, Hotel Muehlebach, Kansas City, Mo.
- 4-8 •National Metal Congress & Exposition, Cleveland, Ohio
- 6 •Industrial Gas Breakfast, Hollenden Hotel, Cleveland, Ohio
- 18-19 •A. G. A. Technical Conference on Domestic Gas Research, Hotel Statler, Cleveland, Ohio

### MARCH

- 6-7 •Home Service Workshop, Pacific Coast Gas Association, Fairmont Hotel, San Francisco, Calif.
- 11-12 •Oklahoma Utilities Association, Annual Convention, Biltmore Hotel, Oklahoma City, Okla.
- 20 •Home Service Workshop, Southern Gas Association, Galvez Hotel, Galveston, Texas
- 21-22 •Southern Gas Association, Galveston, Texas
- 21-22 •New England Gas Association Annual Business Conference, Hotel Statler, Boston, Massachusetts.
- 29-30 •A. G. A. Conference on Industrial and Commercial Gas, Commodore Perry Hotel, Toledo, Ohio.

### APRIL

- 1-3 •Meeting of Electric and Gas Industry Accountants, Netherland Plaza Hotel, Cincinnati, Ohio
- 8-10 •Mid-West Gas Association, St. Paul, Minn.
- 15-16 •A. G. A. Conference on Operation of Public Utility Motor Vehicles, The Stevens, Chicago, Ill.
- 15-17 •A. G. A. Distribution Conference, The Stevens, Chicago, Ill.
- 23-25 •Southwestern Gas Measurement Short Course, Norman, Okla.

### MAY

- 7-8 •A. G. A. Natural Gas Department, Annual Spring Meeting, Hotel Gibson, Cincinnati, Ohio
- 21-23 •Pennsylvania Gas Association 38th Annual Meeting, Galen Hall, Wernersville, Pa.
- 22-23 •Natural Gas and Petroleum Association of Canada, Windsor, Canada

### JUNE

- 3-5 •A. G. A. Joint Production and Chemical Conference, Hotel Pennsylvania, New York, N. Y.
- 18-21 •Canadian Gas Association, 39th Annual Convention, Manor Richelieu Hotel, Murray Bay, Quebec
- 24-26 •American Home Economics Association, Public Auditorium, Cleveland, Ohio

### OCTOBER

- Wk. of 7th •American Gas Association, 28th Annual Convention and Exhibition, Atlantic City, N. J.

## Today

● There are two days in every week about which we should not worry—two days which should be kept free from any fear and apprehension. One of those days is Yesterday with its mistakes and cares, its aches and pains, its faults and blunders. Yesterday has passed forever beyond our control. All the money in the world cannot bring back Yesterday. We cannot undo a single act we performed; we cannot erase a single word we said; we cannot rectify one single mistake. Yesterday has passed forever beyond our control. Let it go.

The other day we should not worry about is Tomorrow with its possible adversities, its burdens, its large promise and poor performance. Tomorrow also is beyond our immediate control. Tomorrow's sun will rise either in splendor or behind a mass of clouds—but rise it will; and until it does, we have no stake in tomorrow, because it is as yet unborn.

That leaves us only one day—Today! And man can fight the battles of just one day.

Yesterday and Tomorrow are such futile worries. Let us, therefore, resolve to journey no more than one day at a time.

—Flori Piper

# Accounting Section

E. F. EMBREE, Chairman

LEITH V. WATKINS, Vice-Chairman

O. W. BREWER, Secretary

## Utility Budgetary Control



A. W. Hatch

BY A. W. HATCH

*Ebasco Services Inc., New York, N. Y.;  
Chairman, A. G. A. General  
Accounting Committee*

IN any dynamic business, effective planning methods are essential to good management. The fundamental management problem of planning and control is no different in principle in any business enterprise—large or small—utility or industrial. The small business owner-manager may figure costs and profits on the back of an old envelope, carry his plans in his head, and control their performance with a watchful eye on each employee and a direct, personal contact with every transaction. In contrast, the complexity of organization and operations of a large corporation calls for special techniques and procedures by which top management may exercise its primary function of sound planning and control. Haphazard methods simply will not do a proper job under any conditions, much less in a time of keen competition and ever increasing cost pressures.

### Budget Not Crystal-Gazing

Probably most utilities have long since adopted some form of budget, if not a complete system covering each phase of the business. Observation of many such systems in practical operation, however, suggests that the value of budgeting in most utilities is still seriously impaired by the mistaken conception that the budget is merely an attempt to predict the future. I assume that any utility management, however disillusioned with the art of crystal-gazing, would as emphatically acknowledge the necessity for prudent planning based on a thorough appraisal of all known facts which may effect its future. Almost any business decision requires specific exercise of judgment, that is, an estimate of the future consequences of alternative actions. Not to look ahead and chart a course is to drift aimlessly with the tide—a course certainly to be avoided.

If I have labored this introduction with rather elementary and axiomatic statements, it is because my experience leads to the conclusion that, consciously or unconsciously, utility executives regard budgeting with skepticism often born of misunderstanding of its purpose. If we are to create an adequate, useful budget system, we must first agree on what we hope to achieve.

Utility accounting executives, and top management as well, may well profit from a study of modern developments in industrial management engineering, budgeting and cost accounting. In this brief paper I can refer only to certain high spots of industrial concepts and practices of budgetary control in the hope that they may provide some inspiration to those utilities which are not now gaining full advantage from a sound budget procedure, to pursue the subject further.

### "Engineered" Budget Standards

The principle of management control through budgets in the industrial field is frequently referred to as "management by exception." Standards are set in the various budgets for all operations and costs, and control is exercised by analysis of the "exceptions" or variances from standards. The element of uncertainty as to future conditions is frequently provided for through flexible budgets which establish varying standards at different levels of operations.

Budgeted objectives are not mere "estimates" or projected trends but actual engineered standards resulting from thorough analysis and study. It is true that in factory operations, for example, it is relatively easier to establish direct labor standards by time and motion studies, and material standards by engineering specifications, than it is to apply such methods to many utility operations. However, similar cost engineering methods are applied to the budgets of industrial service department costs, selling and other distribution costs, and to general and administrative expenses.

These same principles are being applied successfully by some utilities. If we start with a firm purpose to ascertain what a particular operation should cost under certain assumed conditions, it is not too difficult to break that operation down into its elements, to weigh the quantity and price factors, and to set an objective standard in the budget. Budgets established on this principle have real significance to all levels of responsibility. Variances from budgets in either direction can be explained as to nature and cause and thereby point the way promptly to corrective measures.

The fact that conditions are constantly changing, sometimes rapidly, does not detract from the value of budgets prepared on an engineered cost basis. On the contrary, the understanding of our costs which comes from sound budget analysis enables management to assess the impact of new developments promptly, and to deal decisively with them. For example, to a very great extent utility operating costs are semi-variable in nature. That is, they do not vary directly with the volume of work as in the case of factory labor on a piece work basis. Instead, expenses of this type may remain on a specific level throughout wide fluctuations in work volume until a point is reached at which they move vertically to a new level. It is important to understand the nature of our costs. In the foregoing illustration, for instance, it is significant to know with respect to a particular semi-variable expense at what point we now stand on the cost level and when we might be confronted with that next vertical step.

### Labor Cost Control

The labor component of costs in a utility is, of course, one of the most important, and one which, although we generally think of it as controllable, is extremely likely to get out of hand if adequate measures are not taken to maintain a proper relation between productivity and payroll. I know of no better way to control labor cost than through the stimulus of a budget objective based on reasonable, engineered standards of performance.

At this point, let me hasten to explain that by "standards" as referred to here, I do not have reference to such rough "yardsticks" as comparative unit costs within the industry or even among separate divisions of the same company. Like so many unit figures, these "yardsticks" may represent real indications of operating efficiency or they may only emphasize basic differences in territory, in account distribution practices, and in the countless other operating factors which are influenced by the daily operations of large diversified business activities.

To be significant and useful, budget standards must be "engineered," that is, developed by thorough analysis and study of every element of cost and consideration of the various factors bearing upon such cost in the individual case. Past performance and independent "yardsticks" may be useful as a point of departure in a particular study, but they cannot substitute for such study.



Preparation of budgets should be a line function. An independent staff organization is ordinarily required for certain administrative duties such as coordinating and assembling budgets, preparing reports, and assisting in or even initiating the studies required to establish the budgets. But in the final sense, those who are responsible for performance at all levels of responsibility must share with top management in making the plans and setting the standards embodied in the budget.

Budgets must necessarily be expressed finally in terms of the accounts and statistics in use. The process of planning, however, generally originates in terms of quantitative data—volume of work to be done, number of employees needed, material quantities required, and so on. The source data must be converted into dollars and finally into accounts. These steps cannot be bridged merely by projecting past recorded income and expenses by accounts through some assumed percentage adjustments or graphic extrapolation if the result is to be considered an intelligible plan. Budgets must be prepared in sufficient detail as to cost components, significant statistics, and finally accounts as is necessary to assure sound thinking initially and to permit analysis of variances for purposes of control subsequently. Similarly budgets should be developed by cost centers, that is, by departments, plants, crews, or other operating units following the lines of or-

**Meeting of Gas and  
Electric Industry  
Accountants**  
**Monday, Tuesday, Wednesday**  
**April 1, 2, 3**  
**Netherland Plaza**  
**Cincinnati, Ohio**

ganizational responsibility for and functional relationship of the expenses.

The adequacy of the system of accounts in use and of the accounting records are important factors in the successful operation of a budget system. The fact that utilities are tied by regulatory requirements to a uniform system of accounts imposed without regard to operating characteristics or organization of the individual company is something of a handicap. The use of prescribed accounts in budgeting which are often not wholly suited to the purpose of a particular company—and the natural reluctance to incur the expense of supplementary records—is no doubt one reason why so many utility budgets become rather futile statements of cold figures. A modification of the prescribed uniform systems of accounts which would

recognize this condition and permit a certain flexibility in the code of accounts so that it might more closely parallel individual organization structures is an undertaking worthy of study by the utility industry and regulatory agencies. Under existing conditions, some supplemental analysis beyond the uniform accounts is a necessity to most utilities to provide significant cost information by centers of origin and responsibility.

The value of the budget system depends first upon the analytical thought and planning which enter into the determination of the "engineered standards," and secondly upon the extent to which they are used for control of the company's operations. Comparisons of actual results with the budget should be made available promptly to the underlying levels of supervisory responsibility as well as to top management. Variances, good or bad, must be investigated to determine the causes and report on them so that appropriate action may be taken.

Management reports too often are merely historical in the sense that they provide only a record of what has happened, and thereby end where management must begin—that is, to find out why, and what to do about it. A sound budget procedure will do much to bridge this gap. Development of an adequate budgetary control system in a large organization is not a simple task, but its aim, which is indeed the essence of business management, justifies the effort required to establish a workable, useful procedure.

## Nationalization of British Gas Industry Recommended in Heyworth Report

**C**OMPULSORY purchase of all existing gas companies in England, Scotland and Wales was recommended in a report issued in December by the Committee of Inquiry which was set up by Major Lloyd George, Minister of Fuel and Power in June 1944. Purpose of the report, as summarized in *The Times*, December 5, 1945, was to review the structure and organization of the gas industry and to advise what changes have now become necessary in order to develop and cheapen gas supplies to all types of consumers.

Known as the Heyworth Report after the committee chairman, Geoffrey Heyworth, the document recommends new and larger units of distribution and the setting up of ten regional boards to control the gas industry in England, Scotland and Wales.

Each board, it is suggested, should consist of a chairman and six directors, the chairman and three others to be full-time working directors. They would be appointed by the Minister of Fuel and Power for initial periods of five years, subject to renewal for periods of three years.

In selecting the directors the Minister would have the assistance of a gas personnel advisory board of three people. The Minister would fix the remuneration of the

boards to be commensurate with remuneration for like responsibility in industry generally. Independent machinery would be set up to determine fair compensation to be paid for all the existing undertakings which are to be purchased compulsorily.

The organization and choice of staff below the level of the boards would be the responsibility of the boards. Selection of staff taken over would be strictly on merit, and the boards would have power to pay compensation to those persons not retained. Capital should be wholly in fixed-interest forms, guaranteed by the Government for a commission of 1/4 per cent, to be paid by the boards, and all new capital issued would have to be approved by the Minister of Fuel and Power.

A central research establishment should be maintained by a levy on gas sales, and the boards would take on obligations in respect of gas policy, etc.

The committee does not recommend advisory panels of experts or of consumers, or of a standing coordinating committee of Regional Board chairmen, because it desires to place the responsibility for the efficient operation of the industry squarely on the shoulders of the boards.

## Office Planning Report

**T**HE Policyholders Service Bureau, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y., recently issued a report titled "Office Planning and Layout," which provides a great deal of informative material on the arrangement or rearrangement of space for a well-organized office. Charts, layouts, plans, and special sections devoted to heating and ventilating, lighting, acoustic treatment, etc., are all given in this report. Copies may be obtained by executives who request it on their business stationery.

## New Type Encyclopedia

**A** NEW type of encyclopedia, the Encyclopedia of Business Information Sources, has been published as an aid to executives in locating business information sources quickly. There are over 7,000 listings of basic information sources, organized under 222 classifications, which is said to cover every important phase of industry, government and commerce. Leading trade publications, associations, business directories and hand books are listed. The encyclopedia comes in two volumes, loose-leaf.

The work for this encyclopedia has been going on for the past four and one-half years under the direction of W. C. Hanson, business consultant. For information write the National Research Bureau, Inc., 415 North Dearborn Street, Chicago.



# Residential Gas Section

J. J. QUINN, Chairman

WALLACE M. CHAMBERLAIN, Vice-Chairman

F. W. WILLIAMS, Secretary

## Residential Gas Plans for 1946

**E**NCOURAGED by the support accorded the several war-time projects that have been devised and carried out under Residential Section auspices, the New Year opened before this Section of the American Gas Association in a most auspicious and challenging manner.

These projects, which include the colorful New Freedom Gas Kitchen promotion, the development of the Manual of Gas Service and the Sales Selection and Training Program, were included in the presentations made at the Planning Meetings held in thirty-one key cities throughout the country, and have been enthusiastically received by our industry and allied interests.

Committee programs for the current Association year are already in process following the organizational meeting of the Managing Committee of the Residential Gas Section held at Association Headquarters on November 30, 1945. At this meeting, which was particularly well attended by both incoming and outgoing members of the committee, the Section's progress for the past year was reviewed and the plans of its operating committees for the coming year were outlined. The production of domestic gas appliances now beginning to roll off the assembly lines finds the Section prepared to put into effect plans and programs specifically designed to assist the industry in promoting residential gas sales.

### Appliance Financing Committee

Chairman: Harold W. Nichols,  
Assistant Treasurer, Rochester Gas & Electric Corp., Rochester, N. Y.



Harold W. Nichols

Cognizant of the fact that the vast majority of domestic gas appliances in the pre-war era were bought on a time-payment basis, and with all indications pointing to the continuation and accentuation of this trend, this committee has been engaged in making available to the gas industry printed reports on the subject of residential gas appliance financing plans successfully utilized by various gas utility companies. During the past Association year, two reports were completed—the



J. J. Quinn  
Chairman



W. M. Chamberlain  
Vice-Chairman

### BY J. J. QUINN

*Chairman, Residential Gas Section;  
General Sales Manager, Boston  
Consolidated Gas Co., Boston, Mass.*

first of which was devoted to a number of representative gas company appliance financing plans used by them to increase domestic gas appliance sales, and the second featured financing plans made available by gas utility companies to local dealers in financing dealer gas appliance sales.

During the current Association year, the committee plans to prepare a third report which will include full information and details relative to the financing plans which will be available to the gas industry from national financing institutions.

### Dealer Relations Committee

Chairman: H. S. Christman,  
Sales Manager, The Philadelphia Gas Works Co., Philadelphia, Pa.



H. S. Christman

Recognizing the increased importance of the dealer in the postwar domestic gas appliance picture, this committee, which is a new addition to the Section, has been organized for the purpose of preparing material designed to promote the need for more active dealer participation programs. The committee chairman represents a utility company that has had a very successful dealer participation plan in operation for many years.

The committee personnel will include representatives of gas companies in various sections of the country who have been particularly successful in achieving dealer co-operation. Included among the committee's objectives is that of publishing a printed report on dealer participation plans utilized by all types of gas companies.

### Domestic Range Committee

Chairman: J. W. Lea,  
Sales Manager, Atlanta Gas Light Co., Atlanta, Ga.



J. W. Lea

During the past several years, this committee has concentrated its efforts on keeping the "CP" gas range program before gas utility companies, dealers, and the public. The "CP" gas range manufacturers will continue to conduct their effective advertising program in the trade press. In October, 1945, the committee, in cooperation with the "CP" gas range manufacturers, made available to the gas industry a complete "CP" promotional program for their use in distributing to local dealers as a means of increasing dealer interest and enthusiasm regarding the "CP" program.

The committee personnel includes outstanding gas utility executives and representatives from the "CP" gas range manufacturers. The "CP" regional and state organization is now being completed so that adequate representation will be achieved for each region and each state in the United States and Canada. Several former chairmen of the committee who were particularly active in formulating the program are being invited to serve on the committee as associate members. Representatives of the plumbing, dry goods, hardware, furniture and LP gas industries are also being invited to serve as an Advisory Committee.

Among the most important of the committee activities scheduled for the coming year are: (a) a direct mail campaign to the industry on the importance of the "CP" Program; (b) the revival of the "CP" Ranger Club which was an effective medium in promoting "CP" range sales; (c) Publi-

cation of representative dealer participation gas range sales plans; (d) The revision and modernization of the "CP" sound-slide film "Straight to your Heart"; (e) The publication of a monthly "CP" news letter to be followed later by editions of the "CP" Ranger News; (f) The preparation of promotional material and media for use by "CP" regional and state managers in promoting the program in their respective regions and states; (g) Preparation of publicity material for magazines and the trade press on the "CP" program, and (h) The development of an educational program in gas cooking for use by gas utility companies, including a booklet on the Advantages of Modern Gas Cookery, covering the care and use of the gas range for use by the consumer and local schools and colleges; the preparation of a Teacher's Manual on Gas Ranges, and an up-to-date Cook Book.

#### Home Service Committee

Chairman: Mrs. Lillian P. Dunbar,  
Home Service Director, Cambridge Gas Light Co.,  
Cambridge, Mass.



Mrs. L. P. Dunbar

During the coming year, the activities of the Home Service Committee will feature Regional Home Service Workshops. Kathryn Barnes, home service director of the Equitable Gas Co., will be chairman of the meeting to be held in Pittsburgh, Pa., on January 31 to February 2, and Colleen Fowler, home service director of the Kansas City Gas Co., will be chairman of the meeting to be held in Kansas City, Mo., February 4-6.

A series of important booklets will be completed by the committee, one of which is designed to attract home economics graduates to home service work; the second on modernization of the school kitchen; and the third on the selection and training of home service personnel. These booklets are being prepared under the chairmanship of Mrs. Hulda Wells, Ohio Fuel Gas Co., Columbus, Ohio; Ruth Sheldon, Washington Gas Light Co., Washington, D. C., and Jeannette Campbell, Minneapolis Gas Light Company, Minneapolis, Minn.

The committee also plans to prepare articles on home service work as a postwar refresher to home service and sales managers, including such subjects as home service organization; value of records; reports of value of radio, newspaper columns, etc. This material will be well illustrated and made available to the trade magazines and to the industry. A questionnaire will be prepared as a means of gathering facts on how home service is preparing to meet postwar problems.

Aware of the importance of providing educational and promotional material for

schools, the committee also plans to prepare an outline of the type of material which will be of the most help. The aid of gas appliance manufacturers will be enlisted in providing much of this material.

#### House Heating and Air Conditioning Committee

Chairman: Raymond Little,  
General Sales Manager, Equitable Gas Co.,  
Pittsburgh, Pa.



Raymond Little

This committee, which is comprised of executives of gas utility companies experienced in the study of gas house heating, and representatives of house heating equipment manufacturers, will include among its objectives a program to upgrade gas house heating equipment and its installation. The committee will give particular attention to direct heating and summer air conditioning through two special subcommittees.

#### Housing Committee

Chairman: H. Preston Morehouse,  
General Heating & Air Conditioning Representative,  
Public Service Electric & Gas Co.,  
Newark, N. J.



H. P. Morehouse

This committee is one of the most important and active in the Section. It will continue with its varied activities in the diversified field of residential housing.

Relations with the prefabricated housing industry will be strengthened and close contact will be maintained with organizations interested in developing standards and specifications for prefabricated houses. As a result of last year's work of the Subcommittee on Prefabrication, a series of important studies and tests are being conducted at Purdue University on the subject of excess moisture and humidity in prefabricated homes, the results of which should be of particular importance to the prefabricators and the gas industry.

The Subcommittee on Publicity and Specifications expects to have the Reference Manual of Modern Gas Service off the press in February. Plans have been made to keep the Manual up-to-date and to devise means for increasing its usefulness to architects, builders and the gas industry. The committee will also continue its activities in arranging for adequate representation by the gas industry in national home and building expositions.

#### Committee on Improving Domestic Gas Appliances

Chairman: F. M. Rosenkrans,  
New Business Manager, The Gas Service Co.,  
Kansas City, Mo.



F. M. Rosenkrans

This committee is comprised of gas utility company executives who are well versed in the technical and engineering phases of domestic gas appliances, in addition to technical representatives of the "CP" range manufacturers. The committee has the responsibility for the study and revision of domestic gas appliance approval requirements. A study is underway of "CP" gas range requirements aimed at possible revision and upgrading. At a meeting of the Subcommittee on Ranges held in St. Louis, Monday, December 10, a number of important suggestions and recommendations were evolved relative to changes in the current "CP" range requirements. These suggestions were reviewed by the entire committee at a meeting scheduled for Cleveland, Ohio, January 10, at which time the program for the coming year was organized.

#### New Freedom Gas Kitchen Committee

Chairman: W. M. Chamberlain,  
Sales Manager, Michigan Consolidated Gas Co.,  
Grand Rapids, Mich.

Membership of this committee is made up of the chairmen of the Section's appliance committees, in addition to members at large who are executives from various parts of the country, particularly interested in the program.

Since the Postwar Planning Committee recommended the need for a program that would focus attention upon the use of gas in the kitchen there has evolved a set of four objectives for the New Freedom Gas Kitchen Program:

1. To show gas at work in its most attractive settings.
2. To arouse the interest of gas companies generally in a program that will add prestige to them and to the industry.
3. To create in the public mind a feeling that gas service is modern, and to place around our gas flame an aura of magic.
4. To remove at the national level the obstacles which have made our local promotions more difficult.

Attention to these objectives came at a very late date thus making it necessary to crowd into a few short months work that should have been going on for the past several years. Since the inception of this program the activity has been divided roughly into three phases. The first phase consisted of correlating ideas, outlining objectives and arousing among gas companies an enthusiasm for a program that had to click. The second phase was one of preparation—preparing the

gas companies for the operation of the program and preparing manufacturers for the production of the equipment that would be necessary to make the program workable. This same preparatory phase included a large number of contacts with industries other than our own who could help or hinder us in our efforts. We are now emerging from the second phase, ready to embark upon the third phase which is one of action where the utilities will bend every effort towards adapting the program to their own local communities and where manufacturers will provide us with the right kind of merchandise that will assure victory in the coming battle of the fuels.

#### Refrigeration Committee

Chairman: R. J. Vandagriff,  
General Sales Manager, Laclede Gas Light Co.,  
St. Louis, Mo.



R. J. Vandagriff

During the war years, the committee has endeavored to keep the importance of gas refrigeration before the industry. With gas refrigerators now in production, this committee will again become the medium through which aggressive industry promotion of refrigeration will be carried on. Recommendations prepared by last year's committee will be included among the objectives of the current year. These include a national advertising program on gas refrigeration; consideration of a top-flight evening radio program; preparation of a non-commercial educational film on the scientific principles of gas refrigeration; and provisions for market research, customer preference studies, and distribution studies for gas refrigeration. A number of research activities are included for the consideration of the committee during the coming year.

#### Committee on Selection and Training of Sales Personnel

Chairman: R. E. Williams,  
New Business Manager, Binghamton Gas Works,  
Binghamton, N. Y.



R. E. Williams

This committee is in charge of preparing the course on Fundamentals of the Gas Industry for all gas company employees, and the course on Residential Gas Salesmanship, which is a specialized training course for gas company and dealer salesmen. The course on Fundamentals of the Gas Industry is now completed and includes three units—Gas, the Fuel; Gas, the Service, and Build-

ing the Gas Load. Each of the three units contains a recording, two sound-slide films, a printed case problem, leader's guide, and the printed illustrated text. More than 100 gas utility companies have ordered this course for use among their general employees as a means of affording them an opportunity of learning more about the business from which they derive their livelihood.

The course on Residential Gas Salesmanship includes six units—Win Confidence Quickly; Sell the Service; Show and Explain; Complete the Sale; Close the Hard Ones; Plan for More Sales. The first three units will be available in February 1946, with the balance scheduled for completion in the early Spring. The committee is planning to further circularize the gas industry with a series of promotional brochures devoted to a complete explanation of the courses.

#### Water Heating Committee

Chairman: W. J. Schmidt,  
General Sales Manager, Long Island Ltg. Co.,  
Mineola, N. Y.



W. J. Schmidt

During the current year, the committee, membership of which is made up of gas company executives and of gas water heater manufacturers, will continue its activities in bringing to a successful culmination a "CP" program for automatic gas water heaters and their installation, in addition to further publicizing the story of automatic gas water heating. Included in the committee's objectives are (1) a study of gas vs. other fuels for water heating; (2) study of successful water heater campaigns—both sales and rental; (3) preparation of monthly bulletins to be sent to the utilities, dealers, plumbers, trade press, etc.; (4) the organization of sales and other contests.

The committee is giving attention to the subject of research and plans to give attention to the subject of automatic laundries and dish washers as a means of increasing gas sales.

#### Home Service Workshops

HOME Service Workshops, sponsored by the Home Service Committee of the American Gas Association, take place in Pittsburgh on Jan. 31, Feb. 1-2 and in Kansas City, on Feb. 4-6. More than 150 home service directors and sales executives are expected to attend each meeting which includes a comprehensive program on many timely topics. For a complete report on the workshops, see the March A. G. A. MONTHLY.

#### Window and Store Display Committee

Chairman: R. M. Angell,  
Display Director, New York Power & Light Corp.,  
Albany, N. Y.

The committee will continue its work of publishing semi-annual bulletins devoted to reproductions of window and store displays successfully utilized by gas companies. They will also work with poster manufacturers and supply them with information for their use in arranging displays for the gas industry. The bulletins will also feature suggestions for sales floor arrangements, type of display units, and rules that should be observed for successful display merchandising.

One of the most important activities of the Section during the past Association Year was the conducting of Regional Planning Meetings in 31 cities, beginning in Montreal, Canada, on September 14 and ending in Rochester, New York, December 17. These meetings attracted more than 3,000 gas company executives, local dealers and manufacturers. The featured presentation was the All-Gas Merchandising Program developed by Surface Combustion of Toledo, Ohio, which is described elsewhere in this issue of the MONTHLY. In addition there were presentations on the Reference Manual of Modern Gas Service, "CP" Range, Refrigeration, Water Heater and the A. G. A. Sales Training Program.

As we enter upon this first postwar year, there is placed upon the Residential Gas Section a responsibility to the industry that is recognized by those who have accepted committee membership. This membership has been selected on a truly national basis and comprises executives from utilities and gas appliance manufacturers. The committee has facilities with which to carry on its work including a capable headquarter staff, the newly organized promotional bureau, an expanded national advertising program and a recognition by our industry of the need for expanded domestic appliance research. Many intriguing new appliance developments will shortly be ready for our market. Plans are already under way for an annual meeting and an exhibit at Atlantic City next October so, in summary, it may be said that there is much work to be done and the Section is well organized and equipped to do it. We are resolved to make 1946 a banner year of outstanding accomplishment for our industry.

#### Nashville To Get Natural Gas

THE Federal Power Commission has authorized the Tennessee Natural Gas Lines Inc., to construct a fourteen-mile pipeline connecting the main pipeline of Tennessee Gas and Transmission Co., with the facilities of Nashville Gas & Heating Co., thus introducing natural gas in Nashville, Tenn.

# Industrial & Commercial Gas Section

HARRY A. SUTTON, Chairman

KARL EMMERLING, Vice-Chairman

EUGENE D. MILENER, Secretary

## Small Plant Wire Annealing by Gas

**W**IRE annealing in gas-fired furnaces is an old story, but the installation at the Atlas Tack Corporation at Fairhaven, Mass., is of particular interest because it gives the small plant a unit to bright anneal wire. The Atlas installation is a special adaptation of the standard bell-type radiant tube gas-fired furnace for use in small plants where no heavy cranes are available and where there is insufficient headroom for the usual bell-type installation.

At this plant the headroom could not be gained by putting the equipment in a pit as the plant is at sea level, so the required headroom was made available by raising the roof in a small section of the building and installing an elevator over the furnace to raise and lower it for the respective furnace charges. Bases were put on wheels so that they could be moved on tracks to various locations of loading, heating, gas purging, cooling and unloading. These cars can be seen in the accompanying photograph being loaded and in position to be rolled into the furnace area when it has been elevated. It will be seen that all of these base movements can be accommodated to the space and lifting capacities of the plant hoists. Also in the photograph can be seen the bell muffles

which enclose the work to be heat treated and which in turn are enclosed by the furnace shell which contains the gas-fired radiant tubes.

The furnace heating is derived from radiant heat transfer as a result of the combustion of city gas within the tubes. All combustion is complete within the tubes and the products of combustion are discharged from the tubes outside of the furnace so that there is no flame impingement on the inner covers which would be destructive to them and would promote spot heating on the furnace charge. The city gas is taken in at the usual delivered pressure and compressed to  $7\frac{1}{2}$  lbs. for use in the high pressure inspirating type burners fitted to the radiant tubes. On the base holding the charge, there is a recirculating fan which assists the speed of heating and cooling, and assures complete uniformity throughout the charge. This fan has a capacity of 5,000 cfm. so it can be readily understood that the gas movement is made with very high velocities.

At the extreme left in the photograph can be seen the equipment which supplies the controlled atmosphere within the bell during the annealing process. To produce the special atmosphere for bright annealing, city gas is partially burned in a special gas combustor

and in the presence of a nickel catalyst to produce an atmosphere which has an analysis of  $4\frac{1}{2}\%$   $\text{CO}_2$ , 8%  $\text{CO}$ , 12%  $\text{H}_2$ , 2% water vapor and the balance  $\text{N}_2$ . Water vapor is removed down to the dewpoint of plus 40 deg. F. through heat exchangers and a gas refrigerator, at which point it is then in satisfactory condition to bright anneal low carbon wire.

### Date Changed For Toledo Conference

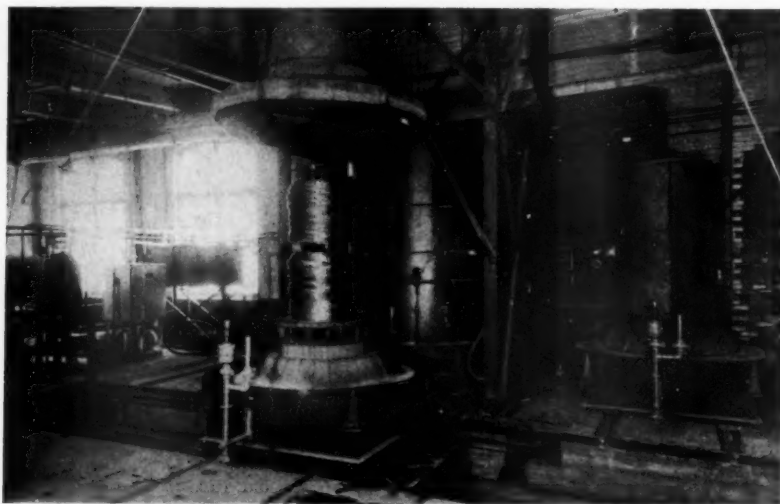
**T**HE A. G. A. Conference on Industrial and Commercial Gas at the Commodore Perry Hotel, Toledo, will be held on Friday and Saturday, March 29 and 30, instead of March 28 and 29 as originally planned, according to an announcement by Harry A. Sutton, chairman, Industrial and Commercial Gas Section, American Gas Association.



Harry A. Sutton

A top-notch full schedule has been prepared for the two-day conference by the Program Committee. This committee, under the chairmanship of Ralph S. Wenner, The Ohio Fuel Gas Company includes; Donald A. Campbell, Bryant Heater Co., Cleveland; L. E. Clancy, Detroit-Michigan Stove Co., Detroit; Hale A. Clark, Michigan Consolidated Gas Co., Detroit; Charles C. Eeles, The Ohio Fuel Gas Co., Toledo; Karl Emmerling, vice-chairman, Industrial and Commercial Gas Section, The East Ohio Gas Company, Cleveland; Wm. H. Frick, American Stove Company, Cleveland; Henry M. Heyn, Surface Combustion Corp., Toledo; C. H. Lekberg, Northern Indiana Public Service Co., Hammond, Ind.; Franklin T. Rainey, The Ohio Fuel Gas Co., Columbus; and Harry A. Sutton, chairman of the Section, Public Service Electric & Gas Co., Newark, N. J.

Among the informative addresses and papers to be presented on timely and vital subjects will be: Prepared Atmospheres, Standby Fuels for Factories Using Natural Gas, Heating for Plastics Processing, Commercial Water Heaters and Boilers, The Industrial and



Coils of wire in place on the movable base over which the bell muffle will be lowered to form an enclosed area for the prepared annealing atmosphere. The entire unit will be placed in the furnace shell, seen in the background, which contains the radiant gas-fired tubes



Commercial Gas Engineer's Opportunities, High Speed Direct Heating, and many others of interest to all gas men.

The luncheon sessions will be addressed by prominent gas executives and invited speakers from outside of our industry. A feature of the conference will be separate panel sessions for Industrial Gas and Commercial Gas participated in by utility men and manufacturers of gas appliances and equipment.

Past experience, research, and new ideas developed during the period of war production have placed the gas industry in a better position to solve problems in gas utilization than ever before. Gas men will want a part in the active period ahead, and the Toledo Conference will afford the opportunity of learning what is in prospect for the future, and how they may share in the opportunities of the ever expanding industrial and commercial gas loads.

### Vapor Degreasing By Gas

IN the magazine "Steel" for November 26, 1945, an article by J. C. Joyce, Joyce and Associates, Los Angeles, on Vapor Degreasing describes in detail the entire operation of this important process of cleaning metal products to prevent corrosion, and for further processing or finishing. Several heat applications, including gas, to vaporize the cleaning solvent are also detailed.

As solvents have improved, it has become necessary to increase the efficiency of vapor degreasing equipment. With the use of gas fuel for heating the solvent, and proper control apparatus, the action of the vaporized solvent is so regulated as to make for faster and more thorough cleaning. At proper temperatures, complete penetration of close-fitting parts can be obtained thus eliminating disassembly and reducing handling operations. All stages of the vapor degreasing process are covered in this article, and it is recommended reading for those interested in this phase of manufacturing.

### Gas Center at Restaurant Show

THE Hotel Stevens in Chicago will be the scene of the National Restaurant Association's 27th Annual Exposition, March 26, 27 and 28, where the American Gas Association will have a Commercial Gas Cooking Center. Surrounded by cooking and baking equipment exhibitors, the A. G. A. location will be the focal point for commercial gas men and appliance manufacturers who will be exhibiting the latest in gas cooking and other gas-fired restaurant equipment.

### Increased Food Production

FOOD manufacturers in spite of not being able to acquire new equipment, did an outstanding job during the war. Washington figures state that the 1944 production of food was 52% above the 1935-39 average.

It is further stated by a leading publication in the food field that at the present time there

is no let-up in sight in the demand for full capacity production.

This should be good news for equipment manufacturers, especially those supplying gas-fired items for use in food processing. There is a large back log of demand for streamlined equipment incorporating the latest technological advances and improved efficiency. The business opportunity in the food processing field for replacement and new equipment promises to be attractive and profitable.

### Live-Wire Industrial Gas Advertisement

THE steady increase in the use of gas as an industrial fuel is the theme of the Baltimore, Md., gas company's advertising in *Industrial Gas*. A striking "ad" in a recent issue symbolizes the increase in the use of gas by local industries from nearly two billion cubic feet in 1938 to over four billion cubic feet in 1944. More than doubling the use of gas in industry in six years reflects a record of achievement that is due in part to the concentration and diversity of industry in that community. Because of this, the State WMC Director states that the impact of war contract cancellations will be less in Baltimore than in other comparable areas.

Consolidated Gas Electric Light and Power Company of Baltimore can look ahead to a still larger volume of industrial gas consumption with the resumption of peacetime production because customers are already specifying increased gas requirements to fill their postwar needs.

### Industrial Gas Sales Engineer Solves Customer's Problem

THE value of the industrial gas sales engineer is forcefully exemplified in a recent article in *Gas News*, the house organ of the Peoples Gas Light & Coke Company of Chicago.

The Stetson China Company on Chicago's south side manufactures a line of attractive dinner ware in the budget price field, and about ninety per cent of the pieces are decorated with fancy floral designs or patterns. One of their problems, and a bottleneck in production, was one phase in the application of the designs to the dishes with decalcomanias. In order to transfer the decals to the china, a sizing or coating of paste was first applied to the dish so that the decalcomania would adhere. As the various pieces came off the conveyor belt to be put in the kiln, they were still damp and had to be separated from each other by small tripods or stilts, necessitating much handling and consequent damage to the designs.

The company desired to eliminate this stacking and use of tripods by having the dishes thoroughly dry before being placed in the kiln for firing, so in order to determine the most advantageous method of accomplishing this, they called in the industrial gas

### A. G. A. Shipment By Air



The first shipment from Pittsburgh on TWA's new airfreight service was 200 pounds of industrial and commercial gas advertising booklets from Ketchum MacLeod and Grove, Pittsburgh advertising agency, to its New York client, the American Gas Association. Robert L. Forsythe, Jr., production manager of the agency, and William P. Medcalf, TWA's cargo representative, see the shipment being put aboard the airliner. The agency expects to use the new service extensively in serving its clients throughout the country.

engineer of the local utility for consultation. Various ways and means of applying sufficient heat to the moist dishes while moving along the conveyor belt were discussed. It was stressed by the company that the dishes must be thoroughly dry and ready to be stacked when they reached the end of the belt.

After careful consideration of this problem the gas engineer suggested that a series of gas-fired radiant cup burners be installed over a section of the conveyor belt. As the dishes with the moist decalcomanias moved along the belt, they were exposed to radiant gas heat which quickly dried them. This operation took place far enough from the end of the belt so that they would be cool enough to be hand stacked at the end, and so dry, that scuffing was prevented.

As a result of the successful operation of this gas-fired equipment, production has been materially speeded up, spoilage greatly reduced and handling costs cut. The Stetson Company, pleased with the ideas of the industrial gas sales engineer, is planning to install additional gas-fired equipment in the near future to further facilitate processing.

## gas grapevine



bakers' helper magazine recently conducted a nationwide survey on several phases of the commercial baking industry. over 58% of the bakers questioned stated that new equipment was the most crying need of the industry. listing the items in order of their importance —ovens came out on top! industrial and commercial gas men should keep their ears to the ground for this new business and make sure it goes to gas.

while we're on the subject of commercial gas men, see you at the restaurant exposition, hotel stevens, chicago, march 26, 27 and 28, where a.g.a. will have "the commercial gas cooking center" located near the exhibits of many prominent manufacturers of commercial gas cooking equipment.

we gotta surprise for the boys at the toledo conference when some of the fellers will unexpectedly have roses pinned on 'em. better not miss it this year, big doin's. p.s. it will be on friday and saturday, march 29 and 30 at the commodore perry hotel, note the change in dates.

hal burkitt, brooklyn union engineer told a new england gas association meeting in boston that, "the newest thing in commercial heating by gas is its wider acceptance by the public."

'tis said 400 gas convection air heaters were sold in one section of the country alone for paint drying and enameling ovens as part of the reconversion program. the total input of these heaters is 470,000,000 b.t.u.'s per hour —the equivalent of 470,000 cubic feet of 1000 b.t.u. gas per hour. a nice load on any line?

we sneaked a peek at the program for the a.g.a. conference on industrial and commercial gas (toledo, march 29 and 30), and it is a complete bill of headliners. we wouldn't miss the conference for anything, every paper will have a forceful message for all gas men.

prepared atmospheres have become the accepted means to carburize, anneal, harden and otherwise heat treat various metals. special atmospheres are also used in the manufacture and storage of paints and varnishes, and they have also proved invaluable for purging gas mains and holders.

a. q. s.

## AMERICAN GAS ASSOCIATION INDUSTRIAL AND COMMERCIAL GAS

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One of the many advantages of GAS and Modern GAS Equipment—Speed.  
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Chemical & Engineering News (Feb. 10)

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#### BAKING FIELD

One of the many advantages of GAS and Modern GAS Equipment—Speed.  
Bakers' Helper (Feb. 23)  
Bakers Weekly (Feb. 4)

#### FOUNTAIN AND RESTAURANT FIELD

One of the many advantages of GAS and Modern GAS Equipment—Economy.  
Chain Store Age (Fountain-Restaurant Section)

#### NEWSPAPERS, PUBLISHERS, ETC.

One of the many advantages of GAS and Modern GAS Equipment—Flexibility.  
Editor and Publisher (Feb. 9)

# Technical Section

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C. S. GOLDSMITH, Vice-Chairman

A. GORDON KING, Secretary

## Simplifying Meter Adjustment

BY A. V. BRASHEAR

*Chairman, Subcommittee on Meters and Metering;\* Superintendent of Meters, Michigan Consolidated Gas Co., Detroit, Mich.*

This article covers pre-adjustment moves and repair operations to simplify meter adjusting and summarizes ideas submitted by members of the Subcommittee on Meters and Metering. This accumulation of ideas, some new and some old, is offered by the committee in lieu of the luncheon discussion which would have taken place had the 1945 Distribution Conference been held.

**W**HAT may appear as standard practice to one shop may actually prove to be a repair novelty to another and may provide this second repair shop with a valuable suggestion for meter repairs. For the most part these are dealt with from the angle of their effect on adjusting, either simplifying adjusting or making it a more effective operation. This is limited to the tin meter field although many of the points presented are directly applicable to iron or steel case meters.

The discussion follows the order of the normal repair sequence. It is essential that a meter be so constructed that its balance throughout the entire cycle of movement is uniform. This balance is best interpreted mechanically by the use of a slope gauge, observing the differential across the meter when operating at some fraction (20% to 50%) of full load.

### Meter Diaphragms

A workman installing the diaphragms and the diaphragm connections, i.e., flag carriage, flag and guide wire, can make a most important contribution toward a smoothly operating meter. The diaphragm should be placed in such a position that the leather will not touch any of the metal surfaces thereby causing a resistance to operation.

With the disc in place, the guide wire and the loops through which the guide wire operates should be so located as to cause a minimum of resistance to movement. Incidentally, some of the companies reporting do not use guide wires in tin meters and they quote experiences of up to twelve years of trouble-free operation. The theory behind this guide wire removal is that the wire is

disc movement in and out is accomplished without any resistance to movement by the flag carriage and its bearing, flag arm or flag rod.

### Packing

There is still a diversity of opinion as to the type of packing which best serves the meter, the general trend being away from yarn and toward a cut-to-size felt washer. The ultimate goal in packing (and this is still on an experimental basis) is to have a grease packed box, thereby reducing the friction of the stuffing boxes to a minimum.

not strong enough to prevent the diaphragm from moving in the direction it wishes and that if it does exercise its function as a guide it is a definite resistance to movement thereby upsetting balance. The point of attachment of the flag carriage should be such that the

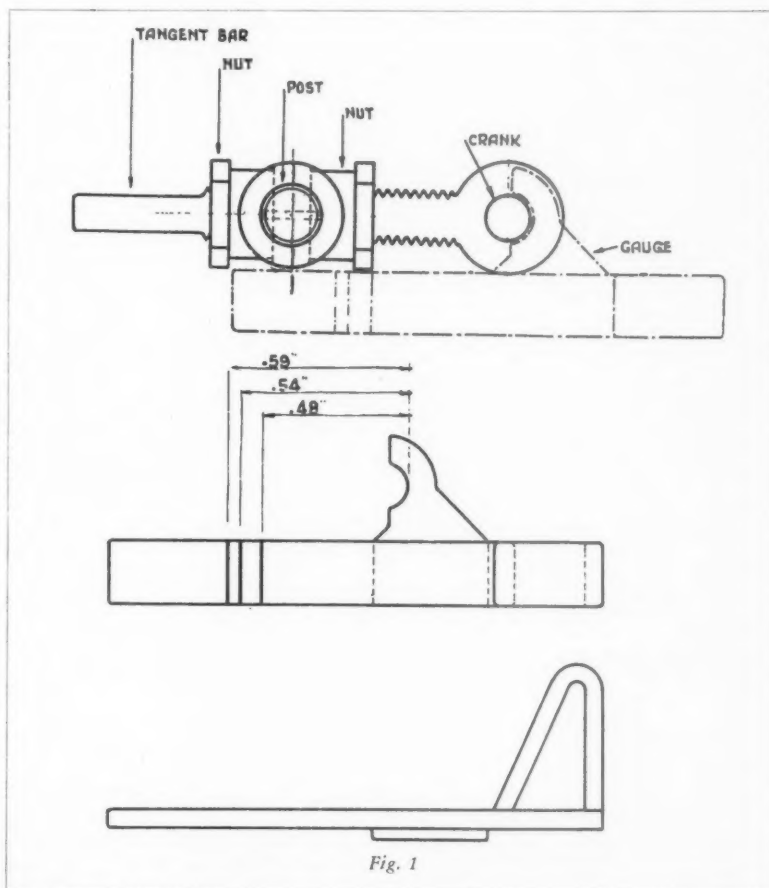


Fig. 1

\*In addition to Chairman Brashear, the Subcommittee on Meters and Metering includes B. H. Elliott, Birmingham; Gilbert Estill, Tulsa; G. E. Griffin, Brooklyn; E. C. Hemes, Milwaukee; B. C. Holman, Minneapolis; W. L. Mashter, Los Angeles; R. J. Ott, Philadelphia; J. E. Overbeck, Columbus; G. A. Palmer, Boston; O. Reiner, Denver; R. A. Seifert, Cincinnati, and B. F. Worley, Houston.

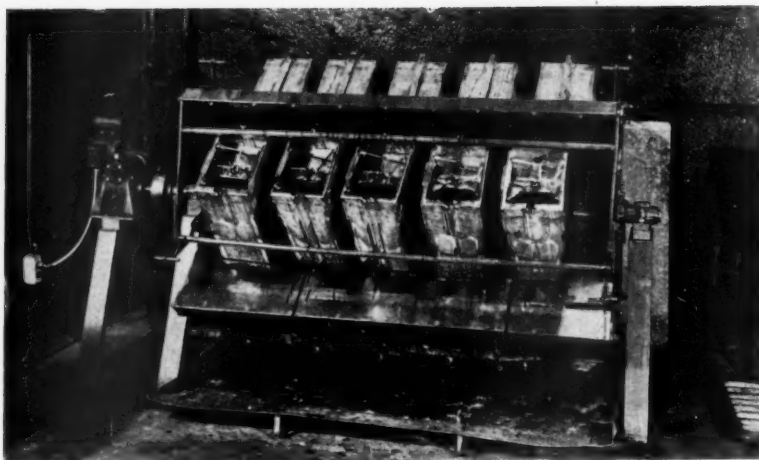


Fig. 2. Rotating oiling rack for gas meters

Minor stuffing box leaks have no effect on meter performance and cannot cause external leaks with the new metal-to-glass bond on index boxes.

Some companies follow a practice of running in meters using from 100 to 1,000 cubic feet of air for this "exercise." This not only serves the purpose of settling the packing into place, but also tends to relieve any binds of a minor nature or wear off any burrs at a bearing point. If this operation is used, care should be taken that the oil content of the diaphragms is not affected as this might result in a proof change.

Other companies report indefinite results with this type of meter "run in" but find that, on the average, meters do change a little in proof early in their service life.

#### Valve Setting

This is the point of extreme importance in obtaining a balanced operation in a meter. General practice dictates that the valve covers and valve seats shall be ground enough to insure accurate seating. One company has experimented in line with the idea that any re-grinding in the repair process is likely to give a poorer seating of the valve cover than it would normally have as it came in from service after wearing on the valve seat in use. No answer is available on this.

Two thoughts on this valve setting have been offered, but upon analysis they appear to be leading toward the same end point after adjustment is complete. In the first instance the valve covers are centered exactly on the valve seat with the respective flag arm in place on the tangent post and the diaphragm at either extremity of movement. This position is arrived at, if any change is necessary, by shifting the tangent on the crank supplemented with the movement of the valve wrist when necessary.

The second method specifies that the valve port be slightly cracked at the time the diaphragm, flag arm and tangent are in the position of extreme movement. For example, when the front diaphragm is in its closed (extreme) position and about ready to start

its outward movement, the case port on the front valve should be slightly cracked. This action indicates that the port opening should just precede the change of movement of the diaphragm. As it turns out the adjustment of a meter to obtain uniform proofs at all rates of operation may result in a change of the tangent on the crank, thus changing the valve timing.

It would take an extensive study to determine which of these two settings result in fewer moves of the tangent on the crank and undoubtedly each meter repair shop reporting is in a position to champion its own position.

#### Flag Arms

Spacing the flag arms also carries weight as a pre-adjustment move for it is here that the balance built into the lower part of the meter may be preserved or upset. The opinion on this point is uniform and specifies that the center of the flag arm opening should clear the center of the tangent post by approximately  $\frac{1}{4}$  of an inch when the meter diaphragm is in its closed position, provided that there is at least this much or more allowance in the open position. These clearances should be balanced with the diaphragm operating in the range of least mechanical resistance to movement. At this same point it is essential that the tangent rotation be in a plane parallel with the meter table and that the flag arm travel be parallel to this same plane without any tendency to dip or twist. It is easy to build an irregularity of operation into the meter at this point.

#### Small Registration Test

A variety of opinions still exist as to the relative merits of a slow-lighting or four-pointing test with many repair shops still specifying both. A slow-light test is an indication of meter performance under conditions of low flow and carries the advantage that it can be made on a closed meter. The four-point test is a specific check on the tightness of the diaphragms, diaphragm channels

and valve covers. The top must be off the meter for this test.

One thought expressed in the use of the four-pointing method was to keep the pressure used for this test as low as possible (0.8" H<sub>2</sub>O in this case). The theory is this—the use of higher pressures stretches the diaphragm since all of the pressure appears as a direct differential across the leather and if this meter moves into the adjusting room shortly after the four-pointing test it may be adjusted before this leather has had time to recover from this distortion (assumed or not). Later recovery may result in an inaccurate registration.

#### Tangent Post

When a partial meter repair does not include the replacement of the tangent it is probable that little shift is required in the post on the bar to bring a meter into proof. When tangent posts are replaced on the bar as a separate operation it is quite probable that the settings will be off. One company uses a small post gauge which has a shoulder which cups against the crank and a bar which extends along the tangent. Grooves indicate the average position of the face of the inner nut for each make of meter and a fairly accurate preliminary setting may be made before making any prover runs. Figure 1 shows the general shape and position of use for this gauge.

#### Short Prover Runs

Many adjusters follow the practice of making all adjustments on runs of  $\frac{1}{2}$  cubic foot (3 tangent rotations for a 5 ft.). It is im-

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Hotel Pennsylvania  
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portant that the full 2 cubic foot runs be used on the final checks in this repair step. This shortens the operation without making it less effective.

### Oiling Meters

In collecting information for this article some ideas were submitted which do not lie within the limits of the title, but manifestly might be of interest to meter shop repair supervision throughout the country. One of the items covered is a rotating oiling rack shown in the accompanying picture, Figure 2. In this instance any meters which may need oiling are fastened onto four tables, five on each table, and one liquid ounce of oil is placed in each diaphragm through the port. The apparatus is then rotated slowly for approximately 30 minutes, permitting complete saturation of the diaphragm leathers. A safety clutch is provided between the drive and the rotating frame to protect against damage to any part in case a meter should drop off.

This method will not work where there are any heavy constituents in the diaphragm oil which would freeze inside the diaphragm channel and restrict the cross-sectional area. In situations like this it is necessary that the fronts and backs of the meters be removed or that holes be cut in the bottoms of the meters and that the meters be immersed in the leather dressing up to a point just below the under side of the valve seat. A description of such equipment was given on page 74 of the February 1942 issue of the AMERICAN GAS ASSOCIATION MONTHLY.

There are undoubtedly many points, both novel and of interest, in meter repair which have been left out of this brief review. Since the Subcommittee on Meters and Metering is intended as a service organization it is only fair to offer its services to clear up any point of question in this report or to use it as a source of information of any nature.

### Calorimeters Discussed

USE of the Thomas or recording calorimeter for high B.t.u. gases, 800 to 3200 B.t.u. range, was discussed at a recent meeting of the A. G. A. Chemical Committee, Dr. C. W. Wilson, chairman. It was pointed out that the U. S. Bureau of Standards research paper No. 519 which appeared in 1933 relative to the Thomas recording gas calorimeter, was confined to low B.t.u. gases, i.e., gases under 800 B.t.u. per cu.ft. However, within the past year, the Cutler-Hammer Company produced a publication summarizing recording calorimeters.

Discussion also brought out the fact that more states are approving the recording type of calorimeter and that the use of the Junkers or manual type is not satisfactory.

### Chemical Exposition

THE National Chemical Exposition, sponsored by the American Chemical Society, will be held Sept. 10-14 at the Chicago Coliseum.

## The Gas Industry in Sweden

ALTHOUGH Sweden managed to keep out of the war, it suffered to some extent from many difficulties which the war brought about, particularly in regard to supplies of coal for industrial and gas-making purposes.

Despite this, however, the municipal gas department of the capital city, Stockholm, managed to carry on, suffering only a slight reduction in output during last year, the total yield having amounted to roundly 4,145,729,000 cu.ft. as compared with 4,353,892,000 cu.ft. in 1943, a decline of approximately  $4\frac{3}{4}$  per cent. There was, on the other hand, a satisfactory increase during the twelve months in the number of consumers from 227,431 to 234,191.

The number of ordinary gas meters in use advanced from 78,881 to 79,048 and those of the prepayment type from 148,550 to 155,143. There was also an increase in the mileage of the distribution mains during last year from 468 $\frac{1}{2}$  to 481 miles, the lat-

ter figure contrasting with only 416 miles at the end of 1938.

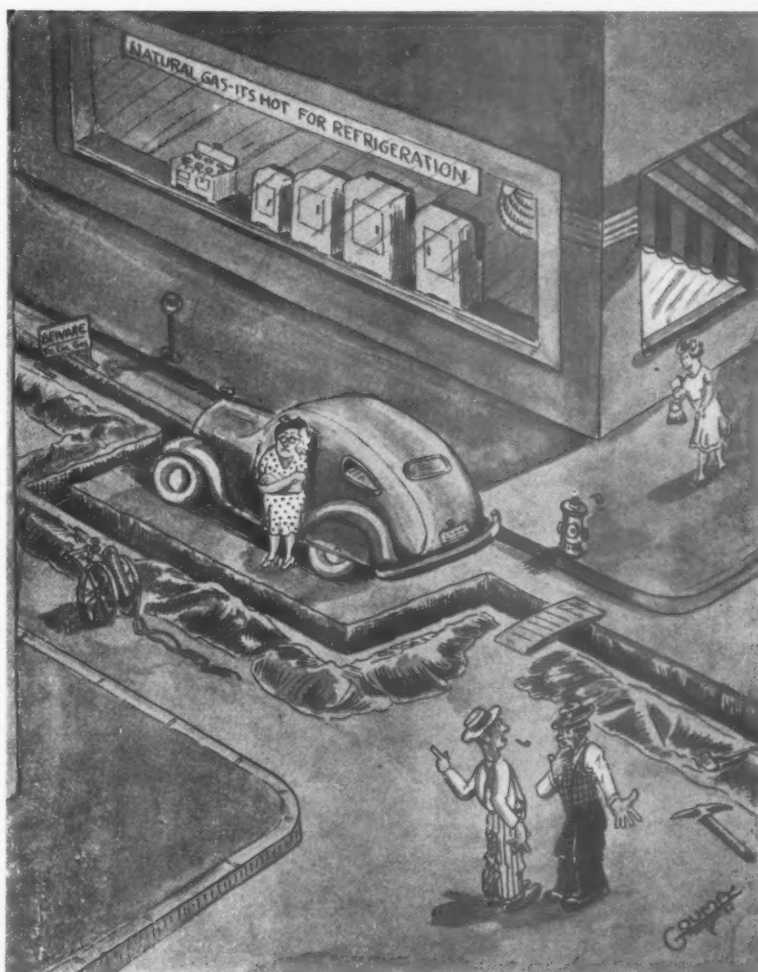
It is also interesting to add that in the year before the war Stockholm's gas production totalled only 3,887,483,000 cu.ft.; the number of consumers then being supplied being 196,044.

C. W. Pilo, the chief engineer of Stockholm's gas works, and his predecessor, G. H. Hultmann, supplied the foregoing information.

—The Gas World, Dec. 22, 1945

## Gas Plant Expansion

THE Connecticut Light and Power Company plans to spend approximately a million and one-half dollars in the next five years for new gas generating, transmission and distribution equipment, as well as other improvements, to provide better service to its gas customers. Capacity will be increased at the Waterbury plant through the addition of new equipment and a new gas generating unit will be installed in Norwalk.



"Gas News"—Southern California Gas Co.  
"She wouldn't move her car!"

# Laboratories

GEORGE E. WHITWELL, Chairman

R. M. CONNER, Director

W. H. VOGAN, Pacific Coast Supervisor

## Research Bulletin on Gas Mixing

**R**ELASE of important technical data helpful to the gas industry in meeting winter peak load demands is to be made in the near future, according to the Mixed Gas Research Committee of the American Gas Association, a joint committee of the Natural Gas Department and the Technical Section. The new information will be supplied in the form of a research bulletin of the American Gas Association Testing Laboratories where the work was conducted.

The scope of the study includes substitution of gases with heating values ranging from 800 to 1800 B.t.u. per cubic foot for three different selected natural gases representative of those commonly distributed. They may be identified as (1) high heating value, (2) high methane, and (3) high gravity combined with high inert natural gas.

New interchangeability equations have been developed for determining limits of flash-back, lifting and yellow tipping when

natural gas is employed as the base gas. Expected to be of considerable interest to utilities is the development of a method of calculating formula factors and evaluating gases, formerly complicated and time-consuming. This has been simplified by the provision of calculation sheets requiring only simple mathematics. Their use makes it possible for operators to evaluate possibilities of interchange of specific gases directly without previously having a thorough knowledge of the basic theories involved or complete familiarity with the textual content of the new bulletin.

The new equations supplement previous mixed gas research studies which were devoted principally to substitutions for manufactured gases and were subject to verification on a representative group of control appliances under extreme conditions of utilization.

Germany. Lt. Kirk served with amphibious forces in the Pacific, Lt. McPherson in France and England, and Lt. Leverett in Europe and North Africa.

Captain John J. Kavanaugh and Technical Sgt. David G. Willich have returned to Los Angeles. Capt. Kavanaugh served in the China-Burma theater with Chinese units as a liaison officer in Field Artillery and Sgt. Willich with aviation engineers in England, France, Belgium and Germany.

## Stop Making Stoves

**L**INDEMANN & HOVERSON have discontinued the production and sale of gas ranges and have resigned from the Gas Appliance Manufacturers Association and the American Gas Association.

## Thorp Heads Laboratories Research Staff



Chester A. Thorp

**P**PROMOTION of Chester A. Thorp of the American Gas Association Testing Laboratories to the position of chief engineer of research was announced this month by R. M. Conner, Laboratories' director. Mr. Thorp's promotion establishes an overall supervision of all Laboratories' research activities as

part of the expansion program now underway in connection with reconversion to regular peacetime operations.

Well known as a utilization engineer, Mr. Thorp came to the Laboratories in October following his release from the Navy as a Lt. Commander. He formerly headed the Gas Appliance Laboratory jointly maintained by Southern California Gas Company and Southern Counties Gas Company of California.

A graduate of Stanford University in chemical engineering, Mr. Thorp has been associated with the gas industry for more than 20 years. He joined the Pacific Gas and Electric Company in 1924 after a year with the Standard Oil Co. In 1926 he became associated with the Los Angeles Gas and Electric

Corporation, later consolidated with the Southern California Company.

In his new capacity, Mr. Thorp will have charge of all research activities at the Cleveland and Los Angeles Laboratories.

## Service Men Return to Laboratories

**T**EN former members of the American Gas Association Testing Laboratories' staff serving in the armed forces have been released and have returned to their positions, augmenting the present staff and making possible expansion of testing and research activities undertaken as the result of increasing appliance manufacturing. Eight have been employed at the Cleveland Laboratories and two at the Los Angeles Laboratory.

Those returning to Cleveland are: Major Bruce A. McCandless; Naval Lt. Walter B. Kirk; Captain Robert T. Hlavin; First Lts. Howard L. McPherson, Donald F. Leverett, Frank E. Hodgdon, and Carl F. Geltz and Staff Sgt. William R. Willes.

Captain Hlavin served as Aide de Camp to General Robert S. Beightler in the Pacific and won the Bronze Star Medal and Oak Leaf Cluster. Lts. Hodgdon and Geltz also won the Bronze Star Medal, Lt. Hodgdon being awarded the French Cross with Silver Star in addition. Both Served in France and

## 1946 Gas Ranges More Automatic

**W**HAT can housewives expect in the way of gas ranges for 1946? The lucky woman who gets one can look forward to some or all of these new features:

Automatic ignition of all burners, from surface to oven and broiler. Automatic clock for absentee bakings. A high-low burner which provides accurate maintenance of temperatures as low as 200 degrees F., now considered desirable for certain delicate foods and low-temperature roasting of meats.

Gas ranges designed to suit individual family requirements. For large households, where considerable baking is done, there will be a range with standard-size oven and a smaller pastry oven. A range with independent broiler having its own burner and placed opposite the oven will fill the bill for families who like broiled foods.

Independent broiler models of many manufacturers are available in two styles—with the compartment of six- to eight-inch depth, suitable for broiling steaks, chops and other shallow foods, and the new deeper, two-way broiler, 10 to 12 inches deep. This has many rack positions for placing the broiler pan and grid at various distances from the open flame.

—New York World Telegram  
based on A. G. A. release.

# Personal and Otherwise

## Elected President of Ebasco



T. C. Wescott

**E**LECTRIC Bond and Share Company has announced the appointment of T. C. Wescott as president of Ebasco Services Incorporated its service subsidiary. Mr. Wescott succeeds S. R. Inch who becomes vice-chairman.

Born in Maine and graduating from University of Maine, Mr. Wescott has been with the Bond and Share system in various engineering and executive capacities for 35 years. During this period, he has had extensive business and engineering experience in industrial and utility work both in this country and abroad.

Company officials stated that this appointment was made in connection with the expansion of Ebasco's engineering and technical services to industrial and public utility clients outside the Bond and Share system.

## Foster Promoted

**R**FIELD FOSTER has been appointed manager of the Stargas Department of Lone Star Gas Company, Dallas, according to announcement by Chester L. May, vice-president of the company. Mr. Foster, succeeds J. Woodward Martin, who resigned as manager December 1. Mr. Foster has been a member of the Stargas Department since 1929 when he was appointed Stargas engineer.

## Hulcy Honored

**D**. A. HULCY, president of Lone Star Gas Company, Dallas, was paid tribute at a special luncheon in Dallas for his outstanding leadership as president of the Dallas War Chest for the past year. The luncheon was given by presidents of the various War Chest agencies and was attended by several hundred friends, officers and directors of the Chest. Mr. Hulcy was presented with a silver tray which was a gift of members of the Chest board of directors and executive council.

## R. P. Russell Awarded Chemists' Medal

**R**OBERT PRICE RUSSELL of Summit, N. J., head of the central technical and research organization of Standard Oil Company (N. J.), has been named to receive the 1946 gold medal of the American Institute of Chemists. The medal is awarded annually "for noteworthy and outstanding service to the science of chemistry or the profession of chemist in America."

The unanimous selection of Mr. Russell was announced by Dr. Gustav Egloff of Chicago, president of the institute. Mr. Russell heads a petroleum research organization that has made major contributions to the development of new processes and new and improved petroleum products, particularly the fluid catalytic cracking process which made possible enormous increases in the output of 100 octane aviation gasoline.

## K. L. Simons Retires

**K**. L. SIMONS, for 15 years head of the Houston, Texas division of United Gas Corporation, is retiring and will be succeeded by W. B. Head, Jr., assistant manager of the division since 1942, it has been announced by J. V. Strange, vice-president and general manager of the corporation. Mr. Head is a veteran gas utilities executive and has held positions with utilities in Texas, Oklahoma and Missouri.

Mr. Head will be succeeded as assistant manager by James A. Wilson, former Houstonian, who is now division manager at Monroe, La.

## Kentucky W. Va. Gas Executive Advance

**D**. B. BEECHER, vice-president and general manager of the Kentucky West Virginia Gas Co., Ashland, Ky., has announced the following executive appointments: H. L. Ley, manager of construction and operation; P. E. Dufendach, manager of engineering and geology; O. C. Cornett, purchasing agent; George W. Hereford, supervisor of gas measurement.

Mr. Ley was educated at the University of Pittsburgh, entered the employ of Duquesne Light Co. in 1924, transferred to Equitable Gas Co. in 1926, and joined Kentucky West Virginia Co. in 1927. He has served since as field agent, land agent and general superintendent.

Mr. Dufendach attended the University of Cincinnati and received a B.S. degree in 1927 from Rose Polytechnical Institute. He joined Byllesby Engineering and Management Corp. in 1927, and after an interval with Louisville Gas and Electric Co., became associated with Kentucky West Virginia in 1929.

Mr. Cornett has served the company in various capacities since 1930. Mr. Hereford was employed in 1940.

## Consolidated Edison Executive Changes



James F. Fairman

At a meeting of the Board of Trustees of Consolidated Edison Company of New York, Inc., December 26, James F. Fairman was elected vice-president in charge of production and operation. Mr. Fairman has been assistant vice-president for design, inventory, testing, purchasing and stores. Production and operation have heretofore been under the jurisdiction of Executive Vice-President Hudson R. Searing.



Harold S. Sutton

Harold S. Sutton, executive assistant to the president, was elected treasurer of the company, effective February 1, 1946, to succeed William F. O'Brien, who on that date will retire under the company's retirement plan after forty-six years of service.

Dr. John J. Wittmer, personnel and medical director, was elected an assistant vice-president, industrial relations. Arthur L. Block, who has been cashier, was elected an assistant treasurer.

Colin C. Simpson, who has been assistant vice-president, production and operation, became assistant vice-president for design, inventory, testing, purchasing and stores.

Other year-end changes in the Consolidated Edison organization included the appointment of Edward E. Hill, who has been associate manager of electric production, to the post of executive assistant to the executive vice-president. William E. Aschenbrenner, who has been an assistant cashier, was made cashier.

## Dean of Tappan Stove Company Retires

**H**ARRY HARBESON, dean of Tappan Stove Company employees, has retired after 55 years and eight months continuous service with the same company. The 73-year-old employee retired to enjoy a long awaited vacation. His job is being taken over by a returned serviceman.

Mr. Harbeson started his long experience with Tappan's on May 1, 1890 in the foundry. He successively acted as apprentice in range assembly and inspector on the assembly line. During World War I he became a shop foreman from which he was transferred to the company's order department. Of late years, he has been employed in the repair department where his knowledge of early models and his remarkable memory for details have been very valuable.



## Personnel Director of Consolidated Edison



Dwight S. Sargent

has been engaged in personnel work for the Edison System since 1922 when he joined the Brooklyn Edison Company.

John C. Arnell has been appointed senior assistant personnel director.

## Rockwell Ad Head

WILLIAM A. MARSTELLER has been appointed general advertising manager of Rockwell Manufacturing Company, Pittsburgh. He was formerly vice-president in charge of sales, advertising and industrial relations of Edward-Valves, Inc., East Chicago, Indiana, a subsidiary of the Rockwell Manufacturing Company.

Subsidiaries and divisions of the Rockwell Manufacturing Company will continue to plan and place their own advertising. Mr. Marsteller's work will be of a coordinating and directing nature.

## Rudd Joins Leffler

ERVINE RUDD has joined William S. Leffler Engineers Associated, of Norton, Connecticut, consulting engineers specializing in utility rate problems and cost analyses. On the first of October, 1945, Mr. Rudd retired as chief engineer of the Connecticut Public Utilities Commission, following twenty-eight years work as chief engineer.

He is a member of the Connecticut Society of Civil Engineers, and the American Society of Civil Engineers, and is a registered Professional Engineer in Connecticut.

## Fry Joins Bristol Gas As General Manager

BRISTOL Gas Corporation, Bristol, Va.-Tenn., announces the employment of Ralph H. Fry as general manager, effective November 1, 1945.

For the past seventeen years Mr. Fry has been connected with various utilities' companies throughout the East, most recent of which was thirteen years with the Central Public Utilities System, from 1939 as division manager of North Carolina Division, located at Raleigh. Prior to this he was division manager of companies in Pennsylvania, with headquarters at Stroudsburg.

He is a past president of the Pennsylvania

Gas Association, and past president and Director of the Mid-Southeastern Gas Association.

Bristol Gas was purchased by local interests in Tennessee from T.V.A. in July 1945, T.V.A. having previously acquired the plant from East Tennessee Light and Power Company.

## Lutz to Surface

SURFACE Combustion Corporation, Toledo, Ohio, has appointed O. R. Lutz as a service engineer on Janitrol gas-fired heating equipment made at the company's Columbus, Ohio, plant. C. B. Phillips, vice-president of the company, announces. Before joining Surface Combustion, he was an administrative officer for the Office of Civilian Defense.

## Lt. Demmler Returns

L T. LOUIS F. DEMMLER, USNR, on leave from Ketchum, MacLeod and Grove, Inc., Pittsburgh advertising agency, has returned to become director of the agency's research and merchandising department. He joined KM&G in 1939 as director of its gas appliance promotion division. Mr. Demmler volunteered for military service in 1943 and participated in the landings at Iwo Jima and Okinawa and the surrender in Tokyo Bay.

## Two Join Bryant

DONALD A. CAMPBELL, manager of the newly established industrial division of Bryant Heater Company, Cleveland, Ohio, announces the appointment of Robert M. Buck and Robert A. Clark to the development staff of the division.

Mr. Buck was previously engaged in research and development work with the Michigan Consolidated Gas Company. Mr. Clark joined the metallurgical department of Otis Steel Company in 1926 and in 1942 became associated with the Lakeside Works of Jones & Laughlin Steel Corporation in Cleveland.

## P. G. & E. Counsel

APPOINTMENT of Robert H. Gerdes as general counsel of Pacific Gas and Electric Company was announced Jan. 18 by A. Emory Wishon, vice-president and general manager. He succeeds Thomas J. Straub who has been appointed special counsel after nearly 35 years of distinguished service as attorney for the company.

## Parker Opens Office

L R. PARKER, who has been general supervisor of appliance merchandising of The Commonwealth & Southern Corporation and its predecessor companies for many years has retired from that position and for the present has established himself as an independent merchandising consultant with headquarters at 4 West 43rd Street, New York City.

## Louis Stotz Opens Philadelphia Office

LOUIS STOTZ, author and publisher of "The History of the Gas Industry" and "Who's Who in Public Utilities" has opened an office in Philadelphia.

He is director of Alumni Centennial Celebration activities in connection with the forthcoming 100th anniversary of the opening of Girard College, of which he is an alumnus. He will also resume his writings and devote himself to sales promotional activities.

Many in the gas industry will recall Mr. Stotz from his previous connections when he was secretary of the old National Commercial Gas Association and as assistant secretary-manager of the American Gas Association.

His mailing address is P. O. Box 7274, Philadelphia 1, Pa.

## Obituary

FREEMAN D. LOHR, works manager of the seaboard division of the Koppers Company, Inc., in Kearny, N. J., and an authority on the operation of by-product coke plants, died on January 16 after an illness of several weeks. His age was 53. He resided at 64 Ely Place, East Orange, N. J.

For many years Mr. Lohr was a member of the Technical Section of the American Gas Association and was particularly active on the Gas Production Committee.

During his thirty years with Koppers, Mr. Lohr took part in the development of processes for the recovery of sulphur, pyridine, ammonia, benzol and toluene. During the first World War he had charge of light war plants in Newark and Paterson, and of the benzol refining plant of the seaboard division. In the recent war he served on the Army's Advisory Committee for industrial plant defense work.

Mr. Lohr was graduated from Cornell College in Mount Vernon, Iowa. In addition to A. G. A., he was a member of the American By-Product Coke Institute, and the Rock Spring Club, West Orange.

He leaves a widow, Mrs. Isabelle Lohr; three sons, Freeman W., Haper and Stuart Lohr; a daughter, Mrs. Phyllis Frost, and his mother, Mrs. Nellie Briggs.

JAMES M. BRODBECK, manager of the Chicago division, Welsbach Street Lighting Company of America, died suddenly of a heart attack December 25, in Hammond, Indiana. He was 61 years old.

Mr. Brodbeck joined the Welsbach Group in 1935 as supervisor of safety in the New York office. He became district manager in 1940, and was transferred as division manager to Chicago in 1944.

Previous to joining the Welsbach organization, Mr. Brodbeck had been manager of industrial relations, Northern Indiana Public Service Company, where he specialized in employee-management problems.



## SET THE STAGE FOR HOME SERVICE

(Continued from page 55)

a dining unit serving as display place for finished demonstration products.

Ideas are what people are looking for—home ideas, kitchen ideas. The Home Service platform can also be a source for such ideas. The closer and more emphatically Home Service backs the general kitchen program and the deeper the understanding and sympathy Home Service has for it, the better qualified it will be to serve the interest of industry and consumer.

It happens that right now the gas industry has its foot in the door to become a great factor in the Home Program. Let's make the most of it. No subject is closer to the customer's heart, or our own for that matter, than the ever interesting, ever to be talked about subject of HOME.

## AUTOMATIC IGNITION DEVELOPMENT

(Continued from page 56)

"lyter" ignites from the constantly burning pilot. These flames impinge on the unit's thermal element, thereby opening the main burner gas valve. Gas then flows to the main burner and is ignited.

The second ignition system, namely, electric ignition, uses an electric hot wire in place of the small constant burning pilot of the gas cycling system. With the electric ignition system, the oven or broiler valve is turned on, gas is supplied to the port of the range "lyter" adjacent to the electric coil and to the unit's valve, where it is interrupted from going to the main burner.

Simultaneously, the opening of the oven or broiler valve energizes an electric circuit and the electric coil glows, thereby igniting the gas at the port of the "lyter." These flames then impinge on the unit's thermal element, thereby opening its valve, permitting gas to flow to the main burner where it is lighted from the range "lyter" flame. The electric ignition, as will be seen readily, eliminates completely any heat liberation in an oven during the periods of non-usage. The oven will, therefore, remain at room temperature with this type of system.

The third ignition system consists of the single-point, flash-tube ignition. This type is similar to the gas cycling

## COLORCUES

COLOR serves five major functions in advertising:

1. Attention value. Color will catch the eye where mere black and white may fail. However, because color is compelling it may also be distracting. This means that care must be taken in the typographic layout. Color should be simple and appropriate, and tied in to hold the advertisement together. It should invite readership rather than discourage it.

2. Realism. In many products color is important in the display of a product. As a dimension it may be as descriptive as size, weight, price, etc. Here perhaps is the most obvious use of color—and one of the best—to glorify a product in its full reality.

3. Identity. Colors are more easily retained in the memory than words or symbols. Used to identify a product or service, and persistently employed to build up recognition, color has potent force.

4. Psychology. Because of the many curious mental and emotional associations of color, subtle applications are possible. The use of color to imply warmth, coolness, cleanliness, etc., may be extremely effective and may well support copy efforts.

5. Beauty. Color has intrinsic appeal. Glorified in drawing or photograph it will command interest, and whether or not it has direct bearing on the copy message. This utility, as distinct from attention value, demands cleverness and strategy and has produced some of the best advertisements ever composed.

As to color preference, men prefer

blue as a first choice. The favorite color of women is red.

As to legibility, black on yellow is by all odds the most distinguishable of color combinations, followed in order by green on white, red on white, blue on white.

The color which appears nearest to the eye is red, then orange, yellow, green, blue, violet.

The hues of greatest appetite appeal, useful in food advertising and packaging, are orange, clear yellow, vermilion red, light green, tan and brown.

Psychologically, red is considered by most people to be the most exciting of all colors, violet and blue the most subduing, green the most tranquil and neutral, and yellow the most cheerful.

In the spring of the year something in our blood draws us to tinted and pastel colors.

In the autumn our attractions swing toward rich shades of red, brown, green and purple.

If we buy gadgets for ourselves we will frequently select them in red or blue. If we buy them as a gift for others we will pick green—possibly because we look upon green as neutral and therefore appropriate to almost any condition.

If we wish to sell highly styled merchandise we look for unusual hues, unique and out of the ordinary.

But if we wish to sell volume merchandise, we move more goods with strictly primitive colors, like red, blue, green and white.

Based on research conducted by the Eagle Printing Ink Co., division of General Printing Ink Corp., is reprinted from "The Torch," monthly publication.

type except that the constant burning flame, instead of being adjacent to the heating pilot, is remote from it, being the top burner pilot which is used to ignite the top burner.

Thus, when the oven or broiler valve is opened, gas is supplied to the port of the "lyter" and is conducted upwards through a flash tube to a point adjacent to the top burner pilot. Flame then strikes downward through the flash tube, igniting the gas at the "lyter" ports. These flames then actuate the "lyter" valve to permit flow of gases to the oven burner in the same manner as the gas cycling system and the electric ignition system.

This new unit, using any of the three ignition systems described above, fits the basic concept that the flame which holds open the safety valve of the automatic lighting device should be the source of igniting the main oven or broiler burner.

An additional automatic feature can be adapted to this system by the use of automatic clock control. The completely automatic clock-controlled gas range enables the housewife to place her dinner in the oven, set the clock to operate the oven for a pre-determined length of time, and go merrily on her way, returning only in time to set the table and serve the meal which has been cooked during her absence.

## Potato Chip Production Doubled

**R**EPLACING two large steel tubs having under-fired gasoline burners with new high-powered gas-fired equipment, Gerald Hatfield of Pottstown, Pa., doubled his production of potato chips without any increase of time or labor. So states a recent article in *Cooking for Profit*.

A modern gas deep fat fryer with a capacity of 485 pounds of oil solved his problem of securing rapid temperature recovery and so preventing the potato chips from absorbing the cooking oil, thus resulting in a superior product.

## HYDRATE STORAGE OF NATURAL GAS

(Continued from page 67)

higher temperatures the hydrate decomposition was quite rapid, and the critical decomposition temperatures were not determined.

After the run had been completed the solution was withdrawn and its freezing point depression redetermined to make sure that the solution had not been changed during the experiment. In every case the freezing point depression was the same at the end of the experiment as it had been at the beginning.

Each decomposition pressure-decomposition temperature point can yield a value of  $n$  at that temperature. For example, in the first experiment with a solution of methanol having a freezing point depression of 1.95 deg. C. the decomposition pressure was set at 40.0 psia and the decomposition temperature was found to be 1.90 C. From Equation (6) the logarithm of the activity of water at -1.95 C. of a solution in equilibrium with ice is -0.00822. The activity of the water in the same solution at 1.90 C. is substantially the same as it was at -1.95 C. if the solute is a non-electrolyte, as in this case.

At 40.0 psia and 1.90 C. (35.42 F.) the value of  $f/P$  is found to be 0.950 by reference to Figure 2. Then the fugacity of the propane was  $40.0 \times 0.950$ , or 38.0 psia, and  $\log. f_1$  was 1.580.

By means of Equation (7) the value of

$\log. f_2$  at 1.90 C. (275.05 K) is calculated to be 1.533. Then, substituting in Equation (5)

$$n = \frac{1.580 - 1.533}{0.00822} = 5.7$$

The values of  $n$  found in the 77 experiments made with solutions are listed in the complete paper which also contains the experimental data; they ranged from 4.5 to 6.7, with an average of 5.8, which suggests strongly that  $n$  is 6 if it is a small whole number. Of the 77 values, there were 17 below 5.6 and 5 above 6.4, so that 55 out of the 77 experiments indicated that  $n$  is 6.

There was no indication of any trend with temperature in the value of  $n$ , and no indication that any one of the four solutes had any special effect on the value of  $n$ .

It appears that this method of determining the ratio of hydrocarbon to water in a solid hydrate of a normally gaseous hydrocarbon is simple and reliable, and may be used in further work on the possibilities of storing natural gas as solid hydrate. Such further work should include application of the method to methane and ethane hydrates. Modification of the method will be required before it can be applied to mixtures of hydrocarbons, such as synthetic mixtures or nat-

ural gases which are mixtures. The presence of non-hydrocarbon components in some natural gases will also require that the method be modified before application to such natural gases.

## Acknowledgment

This paper is constructed from a thesis submitted by the junior author to the Graduate School of Illinois Institute of Technology in partial fulfillment of the requirements for the degree of Master of Science. The work was done at the Institute of Gas Technology where the junior author was a Fellow, and the senior author was Chairman of the Division of Education and Basic Research.

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and handled utility employee publications and public relations. Will go anywhere. 1513.

**Fuel and Combustion Engineer.** At present a Commander in the Navy available June. Five years in manufacture of gas and coke by-products. Two years with nationally known testing and research laboratories. Five years teaching college chemistry. One year teaching electricity, radio and electronics. Proven ability to handle men. 1514.

## POSITIONS OPEN

**House Heating Engineer**—Medium sized Southern utility just converting to natural gas requires the services of a man 35 or under with good technical education and experience. Start immediately. Write fully giving experience and salary expected. Enclose photo if available. 0443.

**Eastern Gas Company** having plant of 12 million daily water gas capacity has opening for **Assistant to Superintendent**. Production, maintenance and design experience desirable. Reply giving full details of age, education and experience. 0445.

**Assistant to Distribution Superintendent**, man for low and medium pressure Gas Distribution System. Location New England. Give complete information including age, education, experience and salary expected. 0446.

**Gas Engineers** with experience on design of Carburetted Water Gas Plants and Equipment. 0447.

Man familiar with general utility accounting and customer billing as **Assistant Controller** for large middle western utility. 0448.

A large marketer in the liquefied petroleum gas industry with headquarters in Chicago is seeking the services of a graduate and **experienced engineer** to head up our appliance service and engineering departments. Must be thoroughly familiar with appliance adaption and have ability to prepare service manuals and distributor bulletins. Please favor us with full details as to age, education, past business history, and salary desired, following which personal interview will be arranged. 0449.

One of the largest gas companies in the Middle West has an excellent opportunity for a **Mechanical Designer** 30 to 40 years of age with experience in plant layout, power plant equipment and reinforced concrete and steel. This position is not a temporary one and all replies will be treated confidentially. 0450.



## SERVICES OFFERED

**Experienced Executive and Engineer.** Has had charge of all engineering, design, construction, operation and maintenance incident to all functions of Gas Industry, both manufactured and natural gas including, for the past twenty years, major supervision of the industrial utilization of gas in one of the largest city's many industries. 1507.

**Operating Executive and General Manager** familiar with all phases of gas production and distribution. Technical education, M.E. degree, with wide experience including considerable sales. Rehabilitation work a specialty. Now employed but available for attractive opportunity. Further details on request. 1508.

**Sales Executive** with large acquaintance gas and electric utilities in Eastern states—have technical education and employed as sales manager for large manufacturer gas appliances for 13 years—will consider any line with possibilities—available after January 15th. 1510.

**Experienced gas customers' service man**, familiar with the installation and servicing of space heating equipment and all other types of gas appliances, meter and regulator installation and leak repair. 30—Married. 1511.

**Gas Engineer**, Chemical Engineering Graduate with over 20 years' experience supervising construction and operation coal, oven and water gas plants and low and high pressure distribution systems. Experienced in customer service, meter repairs and records, account classification, estimating, budgets. 1512.

**Advertising and public relations**—Navy veteran available after January 15, 1946 with gas and electric utility background. Well grounded in all phases of advertising creation and production. Experienced in appliance sales promotion with dealer and employee organizations,

## Words

- There are five little words, I'd have you to know;

They are: "Pardon me," "Thank you," and "Please."

- Oh use them quite often, wherever you go;

There are few words more useful than these.

- These five little words are filled with a power,

That money or fame cannot give;  
So commit them to memory this very hour

And use them as long as you live.

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